

Business

AUGUST 1956 3/

Outlook For EXECUTIVES' SAVINGS

Page 77



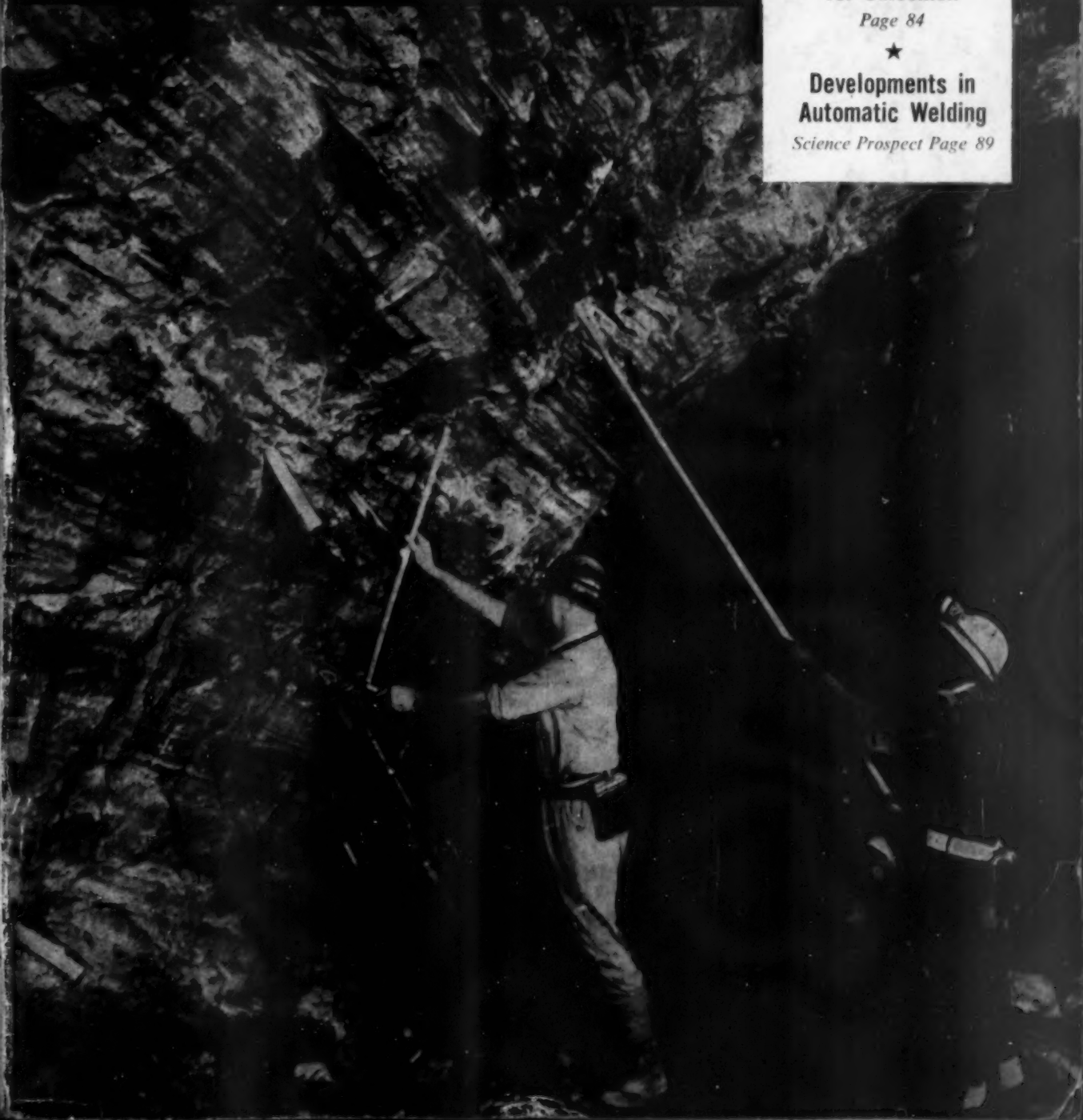
New Incentives for Salesmen

Page 84



Developments in Automatic Welding

Science Prospect Page 89



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The Outlook for Executives' Savings

George Copeman 77

Creeping inflation is upsetting retirement plans. This article discusses ways in which executives may invest their savings so as to retain their full value

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Two case histories show that sales will boom and morale rise in sales contests where everybody wins

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Payment-by-results raised output by 250 per cent. The first of two case histories dealing with typing efficiency

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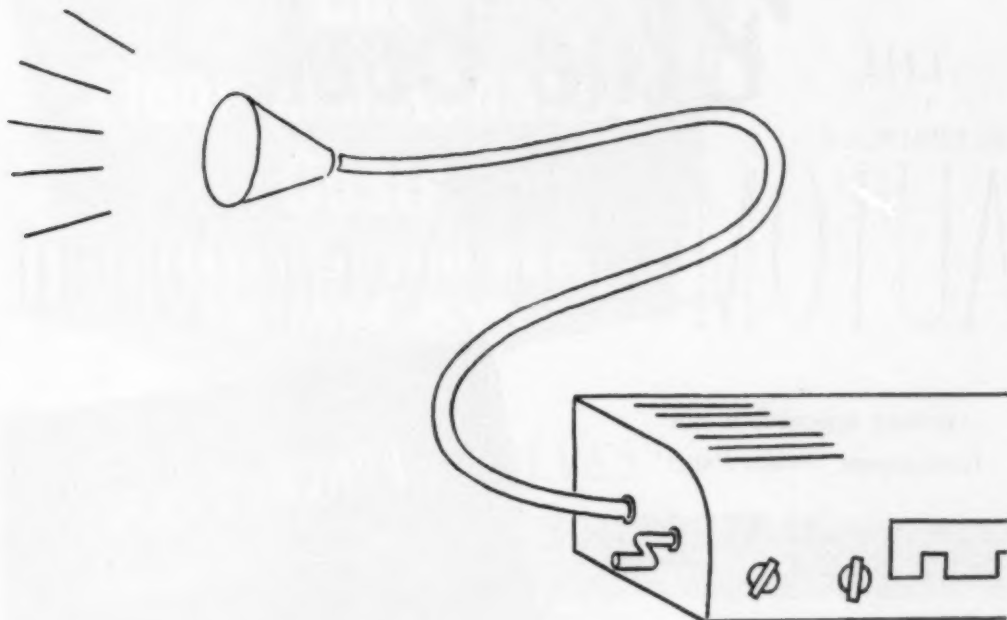
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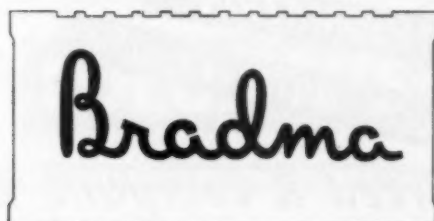
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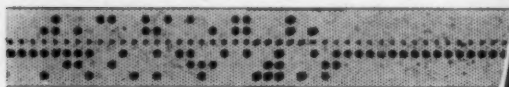


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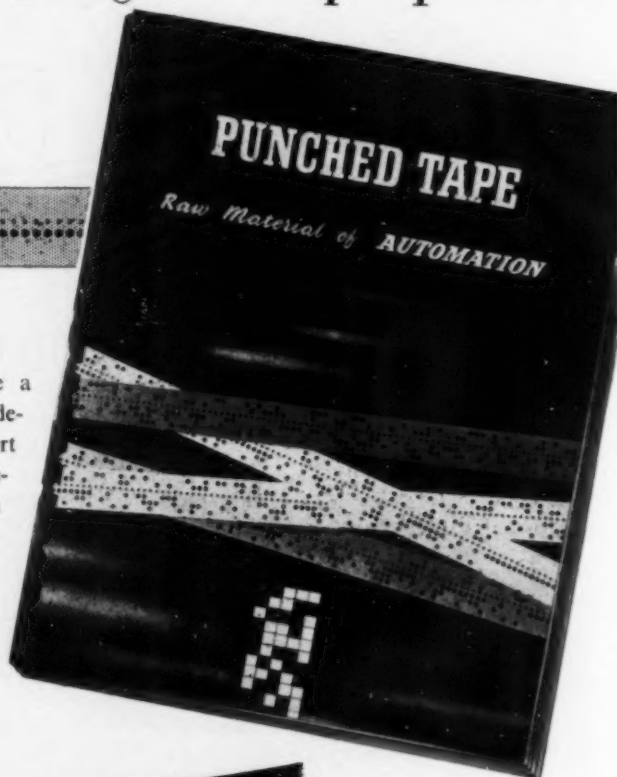
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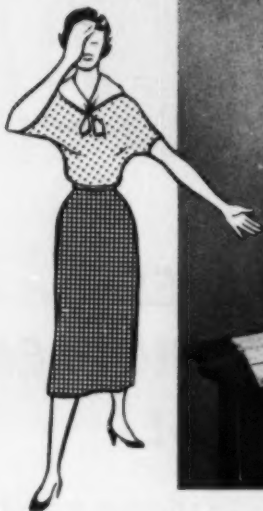
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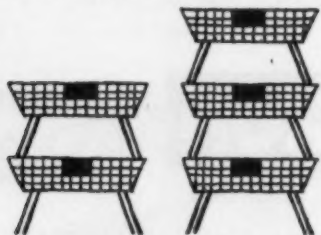
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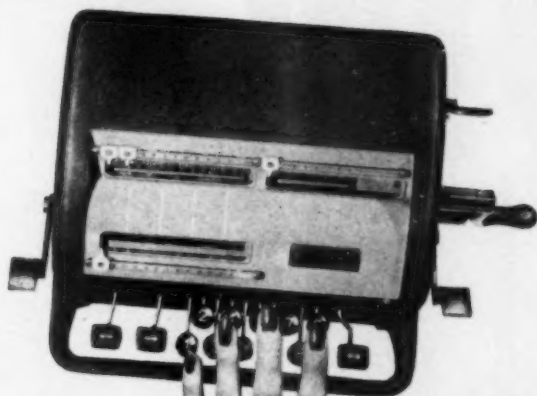
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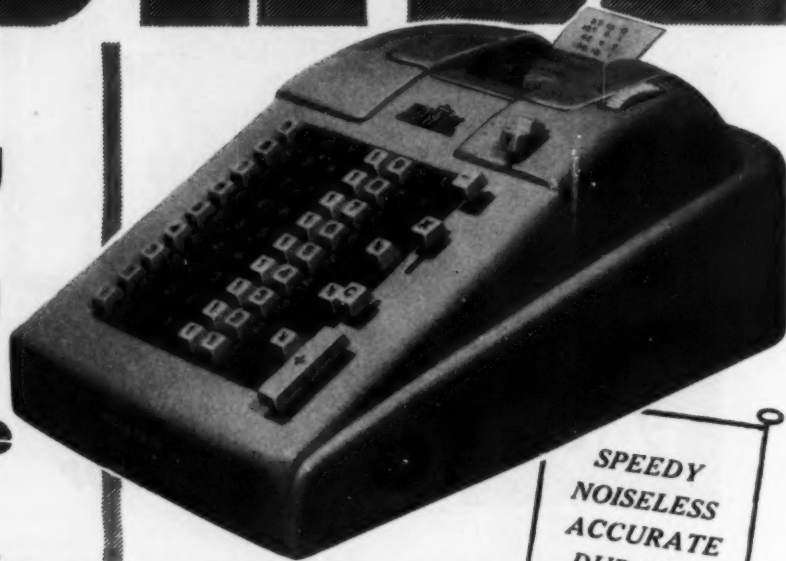
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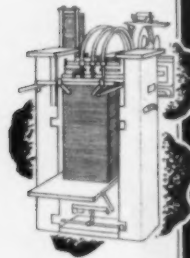
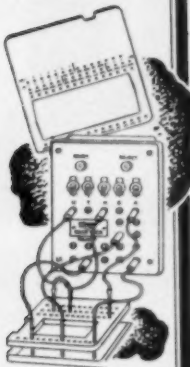
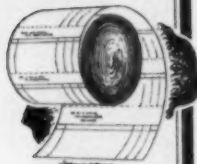
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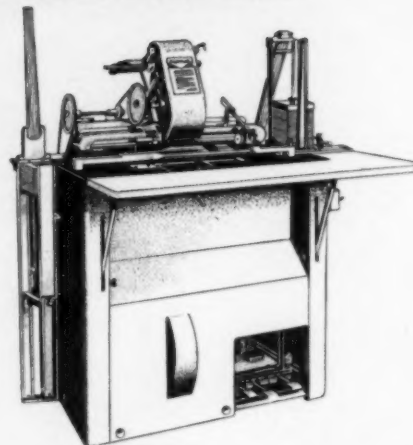
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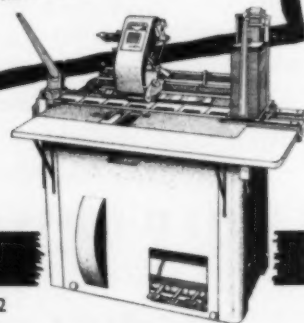
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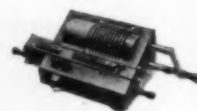
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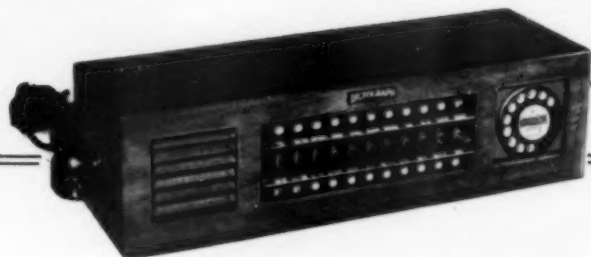
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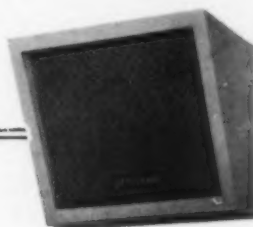


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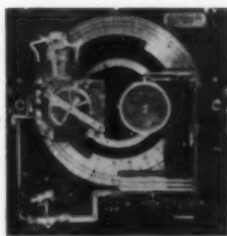
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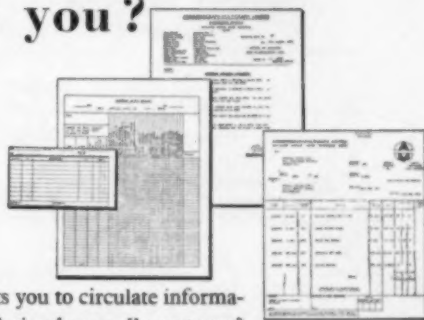
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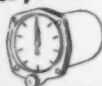


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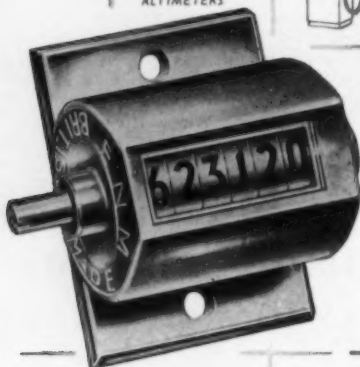
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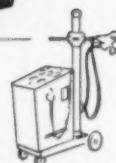
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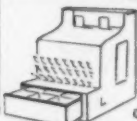
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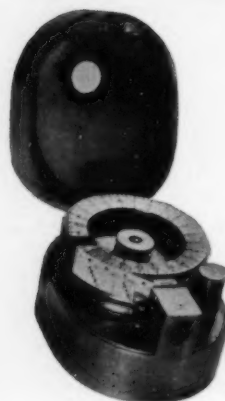
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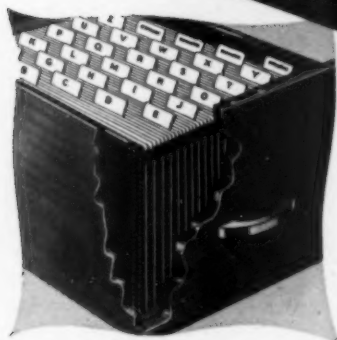
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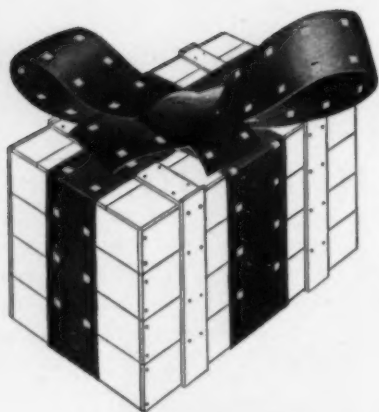
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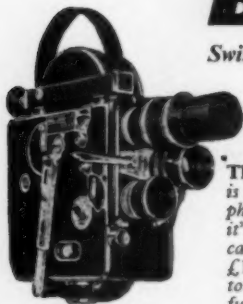
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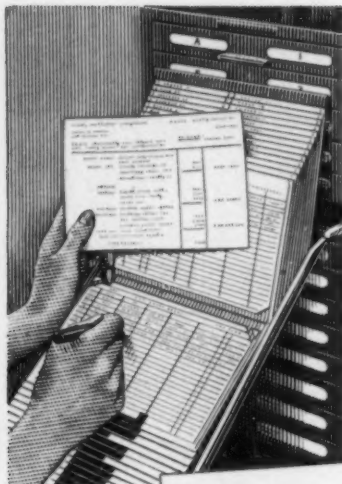
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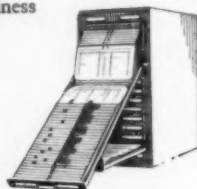
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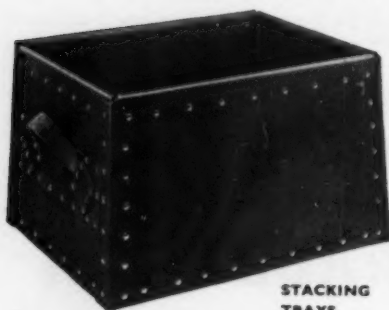
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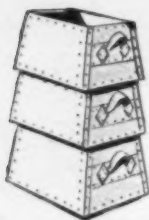


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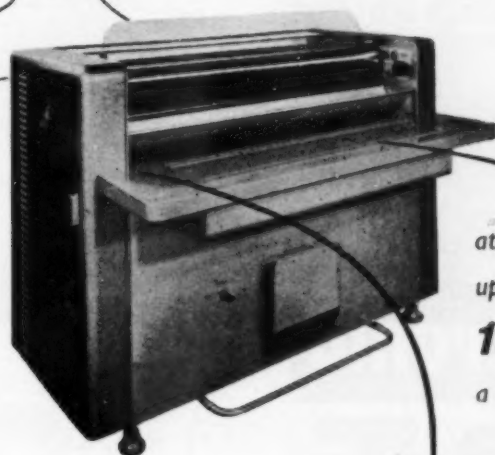
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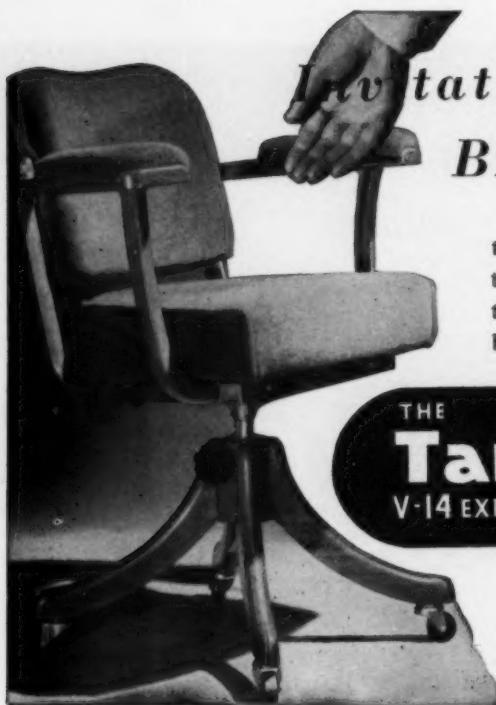
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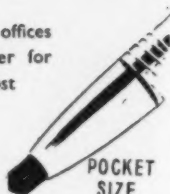
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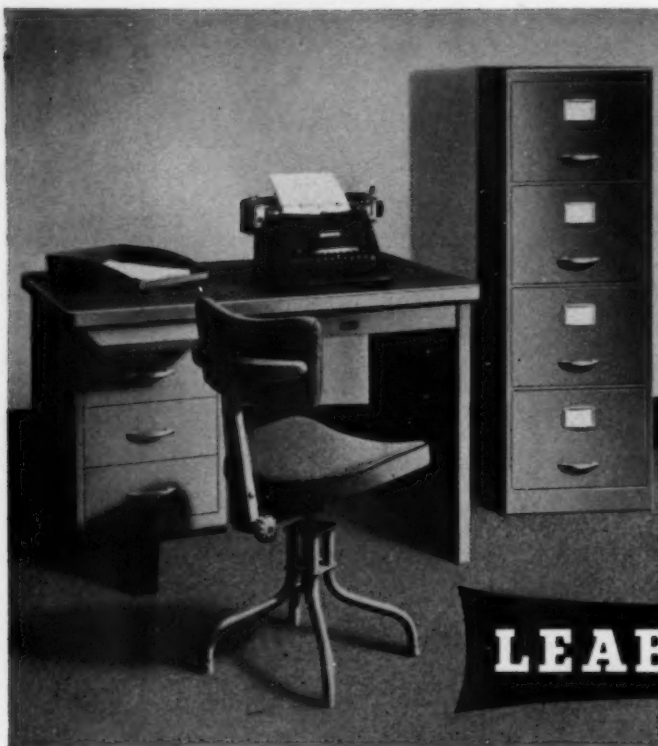
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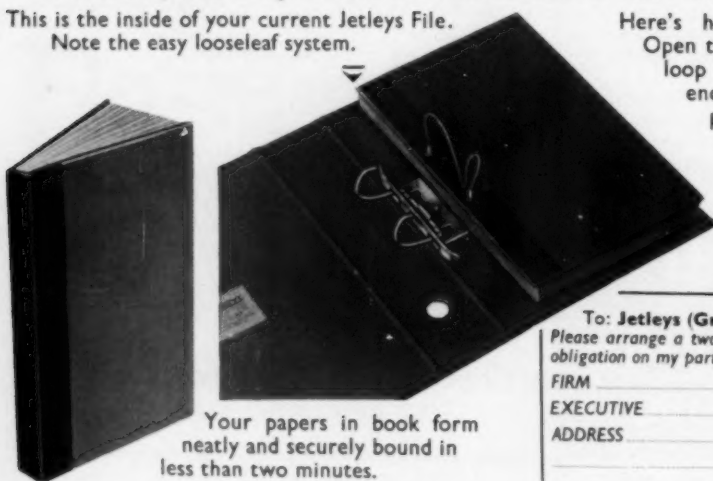
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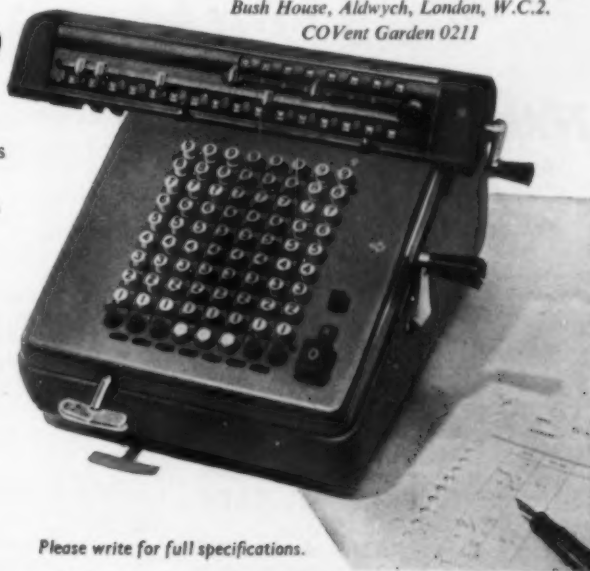
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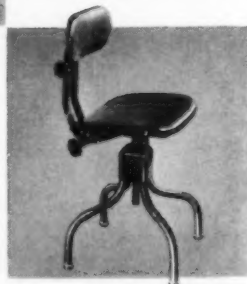
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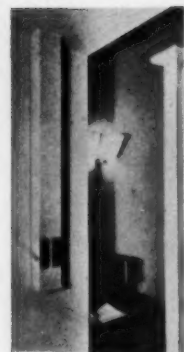
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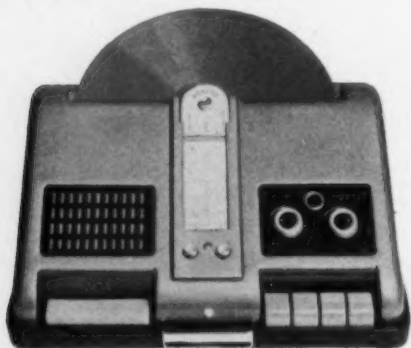
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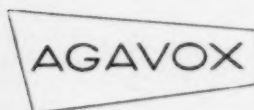
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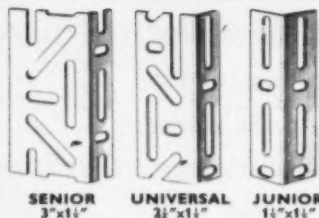
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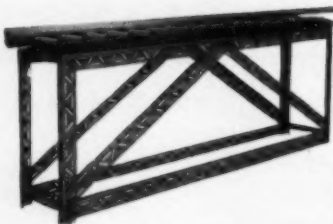
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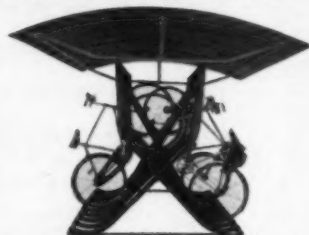
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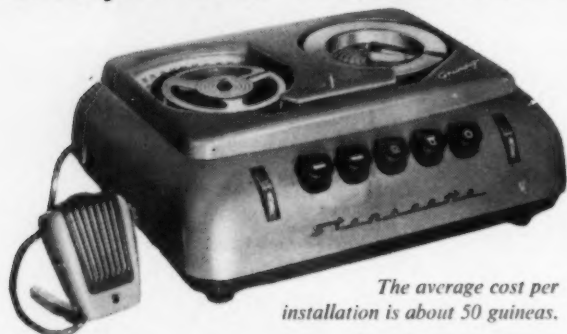
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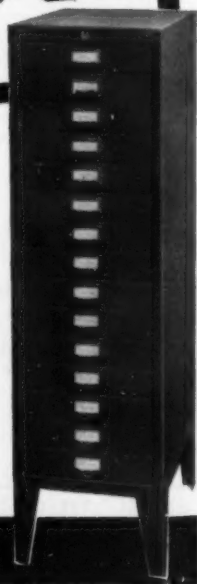
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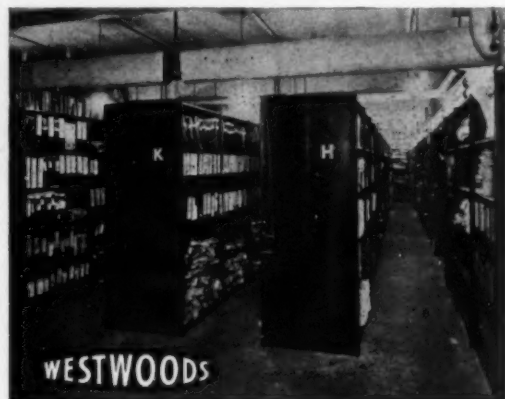
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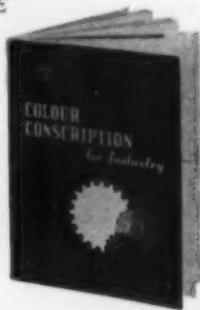
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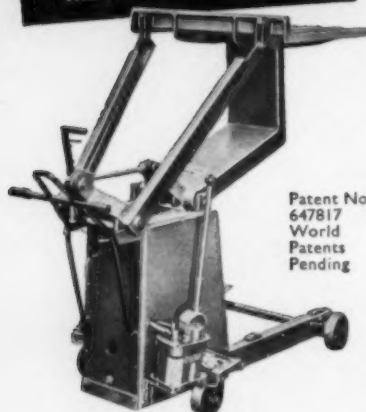


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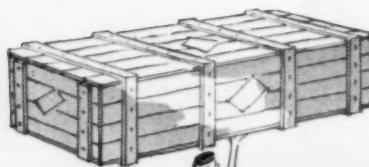


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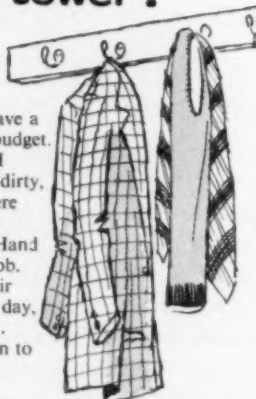
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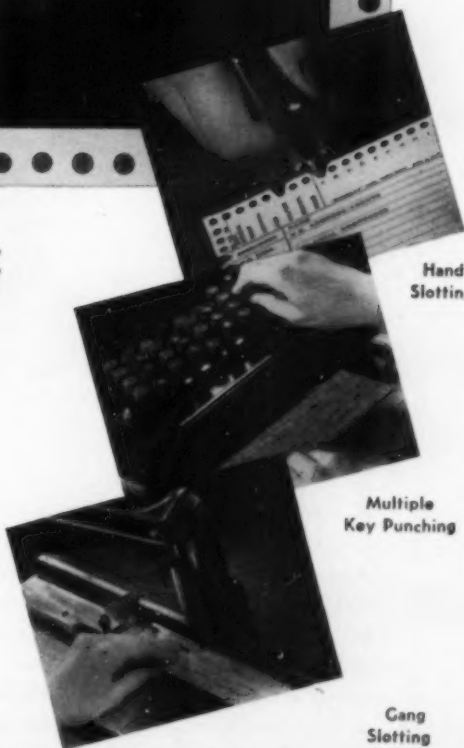
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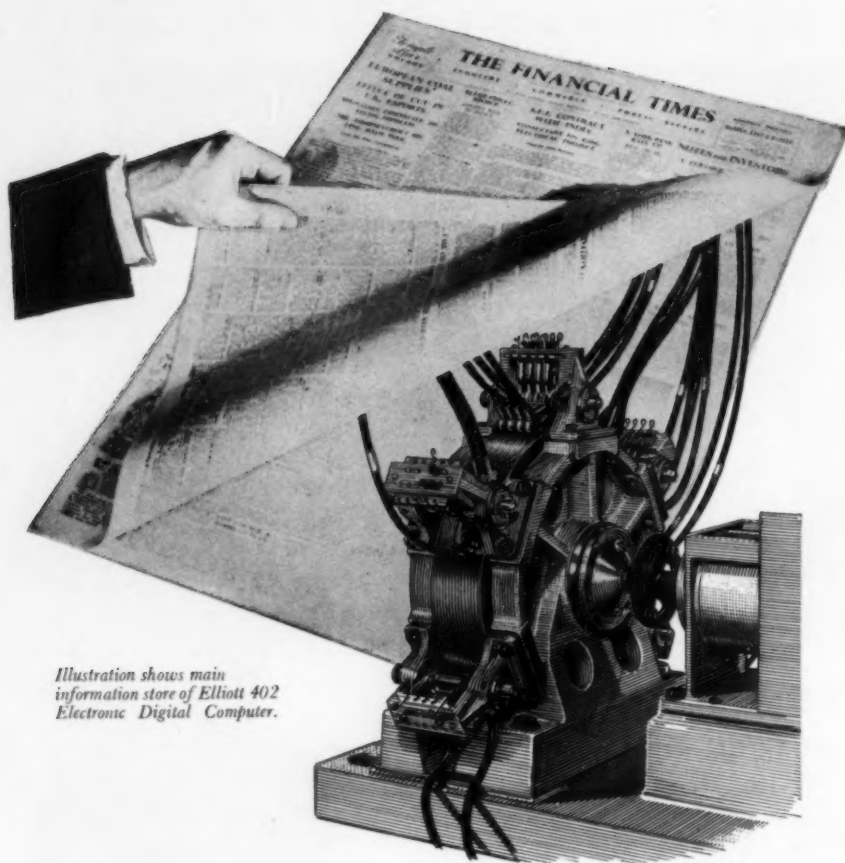


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BUSINESS

ECONOMIC PROSPECT

SURVEY AND FORECAST OF BUSINESS CONDITIONS—The Essential Background to All Business Decisions is presented here in two ways. First, on this page the State of the Nation is depicted under four key heads—production, employment, the trade gap and the gold and dollar reserves. Second, on the following three pages the Main Economic Influences on the State of the Nation are shown under five heads—trends in capital expenditure, consumer expenditure, government expenditure, monetary and financial policy, and market behaviour. For chart details, see footnote to Page 50.

SUMMARY: The Chancellor's "broad plateau" has been reached in production before prices. Falls in output of motor cars and domestic appliances have balanced gains elsewhere. But in spite of a 30 per cent fall from the autumn peak, the motor industry is still producing twice as many cars as pre-war. In the economy as a whole, prices will move only very gently upwards, with business and employment at a high level.

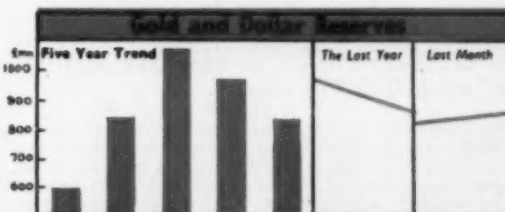
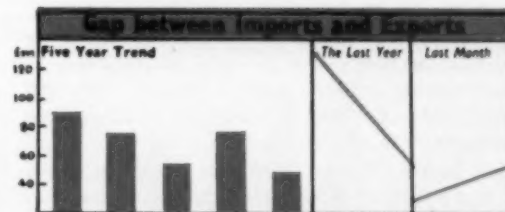
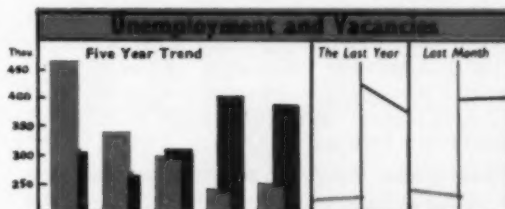
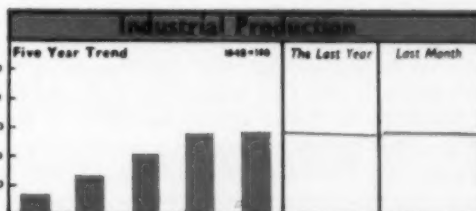
STATE OF THE NATION

Industrial Production. During the period March to May this year, the average index of industrial production was 137 (1948=100). This was 18 per cent above the average level in the first quarter of 1952. But during the last year production appears not to have risen at all, when the latest three months are compared. And the provisional May, 1956, figure of 135.6 is below the level of 138 a year earlier.

Unemployment and Vacancies. During the three months April to June, 1956, the average level of unemployment (colour bars) in the United Kingdom was 238,000. This represented a decline of 48 per cent on the level during the same period of 1952. By contrast, during the period March to May, 1956, the average number of vacancies (black bars) notified to employment exchanges was 383,000, and this represented an increase of 22½ per cent on the average level during the same period of 1952. In spite of recent troubles in the motor industry, we still have over-full employment! In June, 1956, there were 223,000 unemployed and at the end of May there were 397,000 notified vacancies.

Gap Between Imports and Exports. During the three months April to June, 1956, the average monthly gap between imports and exports was £47.1 million. This represents a decline of 46½ per cent on the average gap during the same months of 1952. Not even in 1954, a "good" year, was the gap at this time of year lower than at present.

Gold and Dollar Reserves. During the period April to June this year, the average level of gold and dollar reserves was £843 million, an increase of 41 per cent on the same period of 1952—a period of excessive strain on the reserves. In spite of modest monthly gains since last December, the April to June average level was still 20 per cent below the level two years earlier—a "good" period.



Trends in CAPITAL EXPENDITURE

Industrial Investment Plans. Because the Board of Trade's regular enquiries into industrial investment plans and expenditure only commenced last year, it has been necessary, in the accompanying chart, to tie figures from this new B. of T. survey to figures from the Economic Survey. It would now appear that the revised average planned quarterly expenditure on industrial investment in 1956 will be about £225 million, an increase of 57½ per cent on the actual average quarterly expenditure in 1952. It also represents a 20 per cent increase on 1955.

Factory Building Approvals. During the second quarter of 1956, the total area of factory building approved was 14.8 million sq. ft. This is 73 per cent more than was approved in the second quarter of 1952. But approvals in the second quarter of this year are 31 per cent below those of the first quarter, and 14 per cent below the same period of last year.

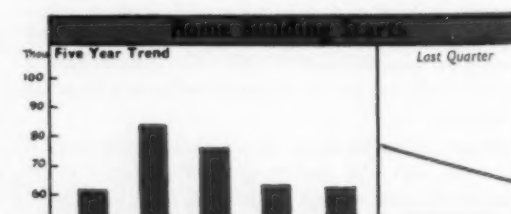
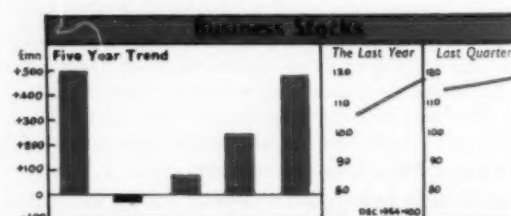
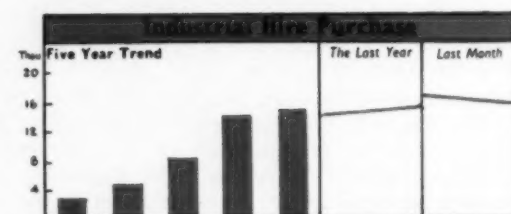
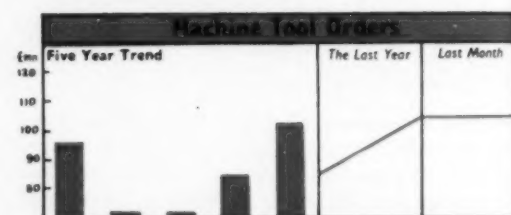
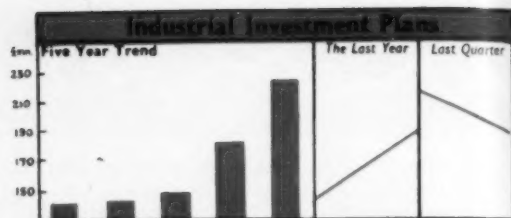
Machine Tool Orders. The average level of machine tool orders on hand during the three months January to March 1956 was £102.9 million—only a slight increase on the average level of £97.0 million during the same period of 1951-52. In April, 1956, the volume of orders on hand was £104.0—equivalent to over 16 months' deliveries.

Industrial Hire Purchase. The accompanying chart is based on figures collected by Hire Purchase Information. The average monthly number of hire purchase contracts for the sale of new cars and commercial vehicles in April to June, 1956, was 15,494, five times as many as in the same period of 1952 and an increase of 8½ per cent on a year ago. The industrial items in the Board of Trade's statistics show, on the whole, a rise in H.P. sales between April and May.

Business Stocks. Bars in the accompanying chart show the change in value of stocks during each of the five years 1951 to 1955, as given in the National Income White Paper. The graph lines show changes in the index of stocks compiled by the Board of Trade. There was a 10 per cent rise in the value of stocks held by manufacturing industry between March, 1955, and March, 1956. The index rose from 113 to 117 between December, 1955, and March, 1956.

Home Building Starts. Permanent houses started in the first quarter of 1956 totalled 62,048, an increase of 2½ per cent on the same quarter of 1952, but a 26 per cent fall on the peak level of 84,200 started in the first quarter of 1953. The number of houses completed in May this year was 25,845, compared with 20,967 in April and 22,456 in May last year.

THE CHARTS: Except where otherwise indicated, each bar chart depicts the average monthly value of a particular statistic during the most recent three months, and compares it with the same figure for each of the four preceding years. The earliest year in each case is shown on the extreme left. Under the heading "The Last Year," a straight-line graph depicts the latest month of a particular statistic and compares it with the same month a year earlier. And under the heading "Last Month," the most recent figure is compared with the one for the previous month. In both cases, the earlier figure is to the left and the later figure to the right.



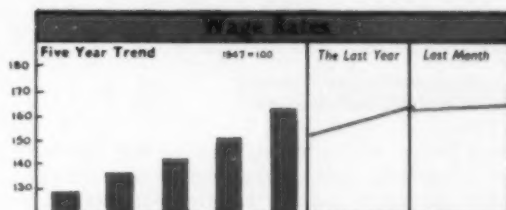
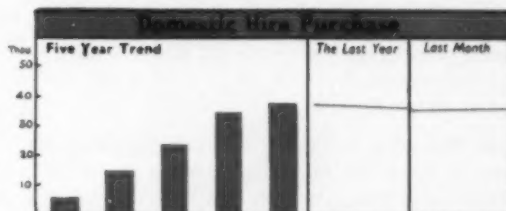
Trends in CONSUMER EXPENDITURE

Retail Sales. During the period March to May, 1956, the average level of the index of retail sales was 142. This represents a rise of 27 per cent on the level in the same period of 1952. As the chart shows, there has been a steady rise. In May this year, the index was 147, which is a substantial rise over 139 a year earlier, and also over the figure of 138 for April this year.

Domestic Hire Purchase. The accompanying chart is based on figures collected by Hire Purchase Information. It shows the trend of sales, by hire purchase, of used cars. Average monthly number of contracts during the period April to June, 1952, was 7,254, and the average number in the same period of 1956 was 37,458, or an increase of over 400 per cent. It is also an increase of 7½ per cent on the number a year ago. The domestic items of the Board of Trade H.P. statistics showed on the whole a rise between April and May this year, though sales of radio, television and musical instruments fell.

Weekly Wage Rates. [In the period March to May this year the average index of weekly wage rates was 163. This represents an increase of 26½ per cent on the average for the same period of 1952, and an increase of 8 per cent during the last year alone.

Personal Expenditure. Between the first quarter of 1952 and the first quarter of 1956, there was a 27 per cent rise in personal expenditure—from £2,436 million to £3,090 million. If allowance is made for higher prices, this represents a 10½ per cent increase in the real value of spending. In the last year, gross spending has risen by 7 per cent, and real spending, after allowing for higher prices, by 2 per cent.



Trends in GOVERNMENT EXPENDITURE

Payments From Exchequer. In the calendar year 1951, Government expenditure was £4,059 million. In the calendar year 1955 it was £5,082 million. This is an increase of 25 per cent. During the same period, prices rose by 19 per cent, so that in effect Government expenditure, in real terms rose by 6 per cent. So far this financial year, Government expenditure is slightly ahead of expenditure in the same period last year.

Budget Surplus or Deficit. The accompanying bar chart shows the Budget surpluses in calendar years 1951 to 1955. These are the above-the-line surpluses. The graph line compares the current financial year with the previous one. At this time of year, the Government is generally running a slight deficit. So far this financial year, the deficit is slightly less than in the same period last year.



Trends in MONETARY AND FINANCIAL POLICY

Bank Deposits and Advances. During the period April to June this year, the average level of bank deposits was £6,182 million. This was a slight increase on £5,987 million for the same period of 1952, but a decline of nearly 4 per cent on the level of £6,417 million in the same period of last year. Bank advances this year during the period April to June were at an average level of £1,931 million—£30 million more than in the same period of 1952, but £188 million less than a year ago. But June Advances, at £1,975 million, were £65 million higher than in May.

Bank Rate. The accompanying chart shows the movement of bank rate since the beginning of 1952. In March of that year, it was raised from the long-standing rate of 2½ per cent to 4 per cent. It later went down to 3 per cent but is now 5½ per cent.

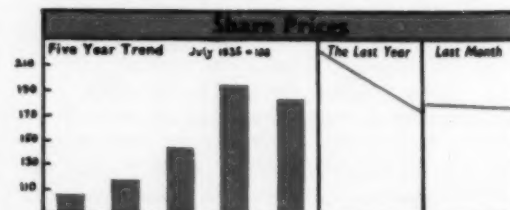
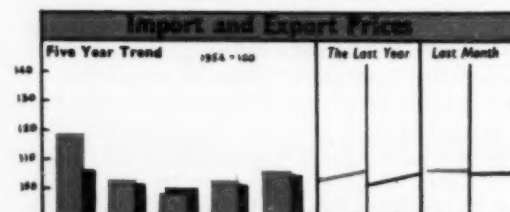
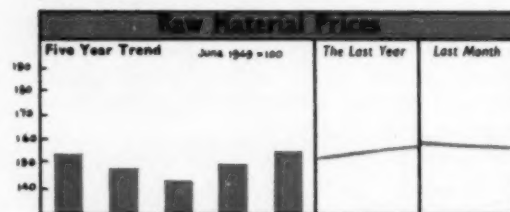
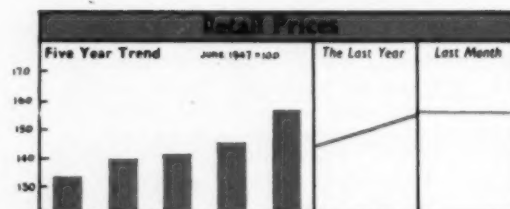
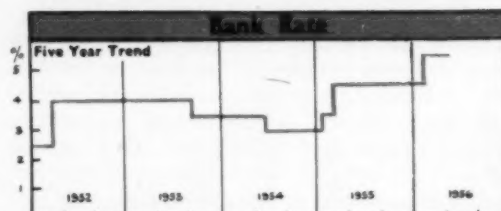
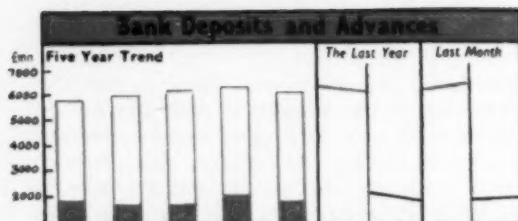
Trends in MARKET BEHAVIOUR

Retail Prices. In the period March to May this year, the average level of the retail price index was 157. This is a 17 per cent increase on the average level of 134 in the same period of 1952 (1947=100). The index for May this year was 157, or an advance of 10 points (6.8 per cent) on the level a year earlier and a fall of 1 point on April this year.

Raw Material Prices. The average level of the price index of basic materials used in non-food manufacturing industry, during the months April to June this year, was 155.3. This was 4 per cent below the level during the corresponding period of 1952. As the chart shows, prices fell and then rose again. In June this year, the index was 155.2, a rise of 4.5 points on a year earlier but a slight decline of 0.7 points on May.

Import and Export Prices. During the three months March to May this year, the average level of the import price index (1954=100) was 106. During the same period in 1952, the average level was 119. There was a rapid decline, as the chart shows, to 99 in 1954, and there has since been a modest rise. In the three months March to May this year, the average level of the export price index was 105. This was one point below the average level for the same period of 1952, but 4 points above a year ago. In June this year the import price index was 105 and the export price index 106.

Share Prices. During the months April to June this year, the average level of the *Financial Times* index of industrial ordinary share prices was 184.5. This represented a 70 per cent rise on the average level of 108.7 in the same period of 1952. In the middle of July this year the index was 1 per cent below the June average level, and 20 per cent below July last year—peak of the boom. But as we went to press, the index was rising.



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Dexion used again. No waste, no scrap. Dexion 225 has a *scientific* design of slots and holes. Each one has a purpose and the remaining metal is left where it gives the greatest strength. That's why a Dexion structure is rigid in itself—you don't need plates or brackets.

Dexion is the slotted angle that started an industry. Now over 100 million feet of Dexion are being used by more than 60,000 firms all over the world. *And 80 per cent of sales are repeat orders.*



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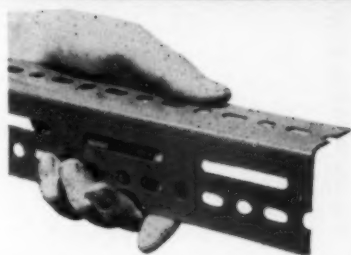
With Dexion, you benefit from years of research and experience, a world-wide organization, free technical service, and fast construction teams for big jobs.

GET THE FACTS

Dexion 225 is sold in packets of ten 10-ft. lengths, complete with bolts. Steel Dexion (price from 1.3½ to 1.5 per foot) is rust-protected, stove-enamelled. Where a light but strong, non-magnetic, non-corroding material is required, use Alloy Dexion (full technical details and prices on request). Send today for sample piece of Dexion and illustrated booklet AY.5 showing many uses in industry. Dexion Ltd., 65 Maygrove Rd., London. N.W.6. (Tel: MAldA Vale 6031-9.)

Another engineering company stores thousands of different metal bearings in this ingenious racking, "tailor-made" to take these uniform metal trays. Note, too, the Dexion trolley, which is also built to fit the trays.

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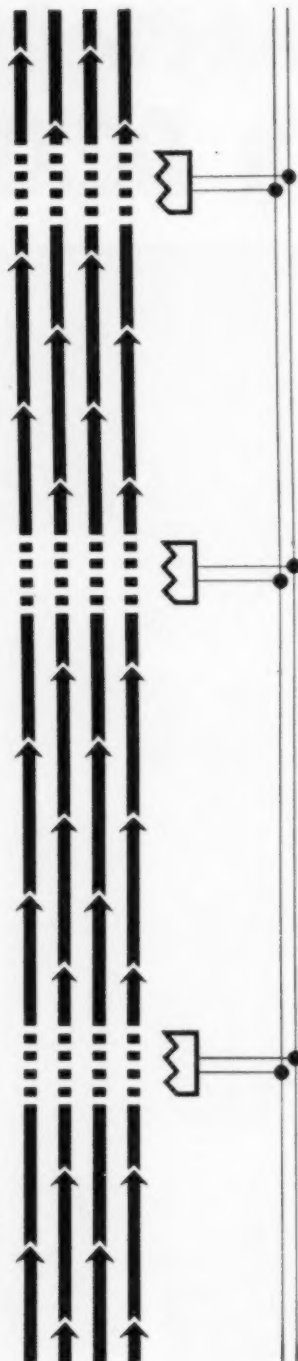
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HOME MARKET SURVEY

A Round Britain Survey: Regional Notes on Markets and Industrial Developments

YORKSHIRE

THE principal industries in the region continue to be very busy, and it is expected that demand for their products will be sufficiently large to ensure high levels of activity for some time. Features of business recently have been the rise in the number of export enquiries and the efforts that individual companies are making in overseas markets. There has been an increase in short-time working and redundancies, due to such factors as the credit squeeze, shortage of orders, overseas restrictions, seasonal fluctuations and overstocking. Industries mainly affected are motor vehicles and parts, woollen and worsted, carpets, furniture, upholstery, and textile dyeing and finishing.

The labour intake has risen in the distributive trades. Over 30,000 vacancies still exist in the area. There has been a slight increase in the numbers employed in engineering where the demand persists for skilled workers, particularly fitters, machine and press tool setter operators and turners.

Although the number of proposals by industrialists for the erection of new buildings and extensions has fallen off recently, in the first three months of this year 108 applications for development certificates were received for a total of 3.29 million sq. ft. of new floor space, compared with 89 applications covering 2.26 million sq. ft. in the same period of 1955.

New railway orders are helping to make up for the decline in demand for steel parts for the car industry, but demand remains high for the commercial vehicle branch.

I.C.I. are continuing their expansion programme at the £50 million Wilton plant. The company's second oil cracker will be coming on stream at the end of this year, and a third is to be built for operation in 1959. It will produce ethylene, used in the manufacture of polythene, and new I.C.I. installations will enable polythene output to be stepped up to over 90,000 tons a year. Cost of these extensions and associated services will be over £16 million. Wilton's steam-raising and electricity-generating capacity is to be increased by the addition of a fourth boiler, which will be the largest on Tees-side.

Firms in the wool textile industry are finding competition in the export markets increasingly keen, although they are scoring some notable successes, particularly in dollar areas. Profit margins are, however, being cut to keep business in some key markets.

Considerable development work has been undertaken by Bradford Dyers Association, who during the past

six years have spent nearly £6 million in keeping their plants up to date. B.D.A. have a one-third interest in a new concern, Silicone Processes Ltd., of 39 Well Street, Bradford, concerned with licensing arrangements for the production of water-repellent finishes on textiles and also on other materials such as leather, paper, films and foils.

A number of major expansion schemes are under way in the steel industry. Costing some £8 million, current Samuel Fox projects include a new bar and rod mill, a second electric arc furnace and a new blooming mill. Due for completion by the middle of next year is a £650,000 rolling mill development scheme.

The English Steel Corporation plan to start the first stage of development of an area at Tinsley Park, Sheffield, towards the end of this year. Open hearth furnaces and heavy forging plant are to be erected on the levelled site, and facilities made available for the production of steel castings heavier than those now manufactured at the Corporation's Grimesthorpe Works.

In one corner of the Tinsley Park site a new works is to be erected to house part of the Corporation's spring plant at Grimesthorpe Works, and a new layout for the production of laminated and coil springs will be installed to meet the demands of the automobile industry.

A two-year plan of improvements to capital equip-



The vertical line at 100 represents the national average level of retail trade for the latest month (May). Against this average the performance of each region may be measured

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ECONOMIC PROSPECT

ment, undertaken by Darwins Ltd, Sheffield, will be completed this year. Since 1950 the group have spent over £500,000 on replacements, improvements and additions. Earlier this year they acquired a new subsidiary—J. Stead and Co., the largest manufacturers of screwdrivers in the country.

A new type of hot-rolling mill is being installed by Shepcote Lane Rolling Mills, Sheffield, to help meet the demand for stainless steels.

The present bar mills of Firth-Vickers Stainless Steels are to be replaced; and Arthur Lee and Sons are to expand their plant for the production of strip, bright steel bars, wire and stainless steel.

Sanderson Bros. and Newbould have in hand a building programme involving the erection of a new bar mill, steel warehouse and bright-turned bar plant.

Some £2.5 million is to be spent over the next three years by Thomas Firth and John Brown on various re-equipment and development schemes, including light forge and heat treatment departments and a 1,750 ton forge shop.

A new assembly line, laid down at the David Brown factory at Meltham, Yorkshire for the building of the 2D two-cylinder diesel tractor, is capable of turning out 40 machines per week. Latest Brook Motors' expansion will be at Hope Bank, Honley, where a new plant is projected on a 28-acre site. About 500 people will eventually be employed in a four-acre factory which will concentrate on the production of fractional horsepower electric motors. Output is expected to be around 500,000 annually.

By next April the new £250,000 building now being built on the 62-acre Doncaster site of the International Harvester Co. of Great Britain will be completed. It will serve as a warehouse for the distribution of spare parts for agricultural machinery.

Field Sons and Co., Bradford, are now in the process of carrying out extensions that will, when finished, increase their works and office area at Lidget Green by approximately 25 per cent. The printing and box-making departments have been expanded and new machinery installed, and the new office block will soon be ready for occupation.

General Refractories Ltd., Sheffield, are extending their production facilities at a cost of £500,000. At Worksop their plant for the manufacture of basic bricks is to be enlarged, and improved types of firebrick are to be produced. Over the past two years the company have developed at Bawtry a new type of silica furnace brick. Large extensions are to be made to the factories where it is produced, thus enabling tonnage output to be increased.

A new office block is now being erected in Leeds for Brotherton and Co., who have over the past two years carried out a large amount of work of a capital nature

BUSINESS

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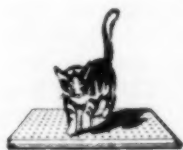
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For your own protection look for the trade mark

RONSON
world's greatest lighter

in plant replacement and works expansion. A recent extension to the firm's central research laboratories has doubled their size.

An extension adjoining the new erection shop at the Leeds works of R. W. Crabtree and Sons enables the company to deal with dismantling, painting and packing and thus clear the erection shop floor more swiftly. It also permits the dispatch of assembled machines of weights over 15 tons.

Enlargements have been made to the manufacturing capacity in the wire mill at the Sheffield factory of Hall and Pickles Ltd., a subsidiary of Hall Engineering Industries Ltd.

Up to £600,000 is to be spent in the next two or three years on development projects and replacement of machinery by Daniel Doncaster and Sons, Sheffield, whose Monk Bridge works are now on a production basis for a substantial proportion of their output. To take some of these products further towards the finished stage the company are proposing to establish a works in Lancashire.

Newton, Chambers and Co., of Thorncliffe, near Sheffield, are committed to capital expenditure of some £600,000 in connection with their policy of extending and re-equipping their works and production facilities. Additions have just been completed at their Izal factory, enabling output of paper and disinfectant products to be stepped up. In the heavy construction department of the firm's engineering division, work is in progress on a new development building and on an extension to the construction shop. Particular attention is being directed to the development of heat exchange equipment, chemical by-product plant and Class 1 welding. In four years the firm's excavator division has quadrupled the volume of its export business.

New research and control laboratories of Reckitt and Colman Holdings Ltd., will soon be completed at Hull. A £500,000 tonnage oxygen plant which British Oxygen are building near Middlesbrough will be in operation next February with an output of 250-300 tons of oxygen per day.

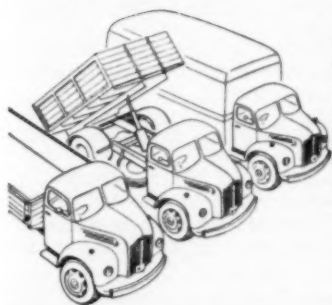
Davy and United Engineering Co., Sheffield, are currently working on large contracts for the Australian Iron and Steel Co. One order, worth nearly £500,000, covers the supply of extensive roller tables for a new slabbing mill to be installed in the Port Kembla, New South Wales, works. Altogether, Davy-United will be delivering, early next year, about 4,800 tons of new machinery.

The U.S. agents of T. S. Harrison and Sons, Heckmondwike, Yorks., have ordered £32,000 worth of swing lathes from the company. The business has largely followed the firm's participation in the American Society of Tool Engineers' Exhibition in the spring.

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TGA L

EXPORT MARKET SURVEY

A Round-the-World Survey: Country by Country

LATIN AMERICA 3. COLUMBIA—A Developing Market.

HAILED both as "The Gateway" and "The Athens" of South America, Colombia could probably be far more correctly termed its "Unknown Country," for, comparatively little explored by outsiders despite its great potentialities, it is equally unfamiliar territory to the majority of its inhabitants. Numbering around 11.5 million, an increase of 25 per cent in as many years, they have until recently been confined almost inescapably in one or other of the four main regions—the mountainous west, the Pacific jungle zone, the northern coastal plain on the Caribbean and the flat Llanos in the east.

Transportation has proved the major trade problem. Rivers have been the main highways of the country. At the beginning of the century only 75 miles of road existed: this total has now climbed to some 13,000 miles, and a large-scale construction programme has been embarked on, aided by a £16 million loan from the World Bank. In the past four years traffic has doubled in volume over most roads and tripled near the big cities. On the main highway crossing the central mountain range daily traffic has multiplied tenfold. One new scheme covers a 40-mile road between Cienaga and Barranquilla on the Caribbean coast. It will connect with the Atlantic (Magdalena Valley) Railroad now being constructed with other World Bank loans. Colombia was the first South American country to establish an air service. This was in 1919, and there is today an extensive network, operated by private enterprise. The air future is bright, for although freight charges are higher than for surface transport, these are offset by greater speed of delivery and freedom from theft and damage. An international airport is currently being established at Bogota.

Other problems have been bound up with the country's very geography and climate, and these have proved both severe and costly. The Magdalena, for instance, due to its erratic course, each year washes away about one million acres of top-soil. Plans now being put into operation, however, may well transform the situation, for Colombia's water power potential is estimated at 5.4 million h.p. The combination, too, of tropical climate and varying altitude has made possible the cultivation of a wide range of agricultural products, ranging from coffee, rice, bananas, sugar cane, cotton and tobacco to wheat, potatoes, citrus fruits and apples.

Since agriculture employs about 60 per cent of the labour force and earns over three-quarters of Colombia's foreign exchange earnings, considerable attention

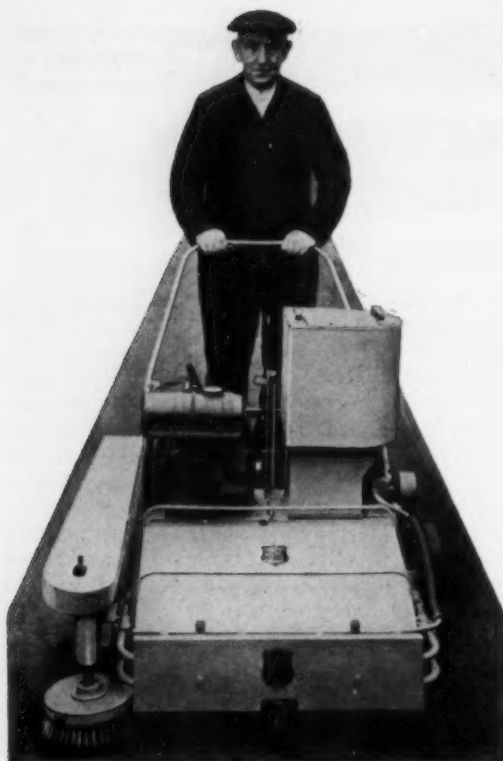
is being paid to its improvement in current development schemes. The task is formidable, for about 70 per cent of the land is covered with tropical forest and only 2 per cent is used to cultivate the principal crops. Colombia's area is equal to that of England, France and Germany combined, but it is, nevertheless, a country of small farms—some 700,000, all told. Productivity has been low, due to poor cultivation techniques, erosion and lack of irrigation schemes, and mechanization has been rudimentary. Colombia is second only to Brazil as a coffee grower, responsible today for about 18 per cent of world output, but having seen her principal crops fall out of the market in years past for one reason or another, she is anxious to lessen her reliance on a monoculture.

Because of her increasing population, Colombia must step up her agricultural output by 25 per cent in the next 10 years. A World Bank mission which, headed by Sir Herbert Stewart, the British agricultural administrator and adviser, has been studying this problem, believes that it is possible to achieve this target and give self-sufficiency in food, except wheat, and, additionally, a rise in consumption standards. Better use will need to be made of existing land and improvement effected through water control, and new land opened up. Farm training must be intensified and pools of machinery established. Irrigation projects recommended by the mission would benefit nearly 1 million acres.

The Cauca Valley, which contains about 25 per cent of the total population and produces one-quarter of the national income, is the scene of Colombia's most



A contract worth \$3 million for 3,200 of these 'Kingstrand' aluminium houses, for the rural areas of Colombia, is now being fulfilled by Northern Aluminium Co. Ltd. and A.P. Metalcraft Ltd.



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ECONOMIC PROSPECT

ambitious project, which is modelled on the Tennessee Valley Authority. Main objectives are the production and distribution of electric power and the proper use of the valley's water resources, and work is now starting on the 120 MW Rio Calima hydro-electric plant.

Industrial development did not begin until around 1930 but growth has been rapid since then, and today self-sufficiency has been achieved in a number of products, notably textiles. In 1940 the Instituto de Fomento Industrial was set up to carry out projects too big for private firms to undertake, such as the mechanization of the coal mining industry in Valle and on the Caribbean coast, the erection of the Betania soda ash plant and the establishment of the Paz de Rio steelworks. This is now producing rails, billets, angles, bars, wire, etc., but last year it operated at a loss of £17 million.

Other Instituto projects include the construction of a factory for vegetable oil production in Barbosa, a rope works at San Gil and tyre and fish-processing plants. A pulp and paper works is planned; a British company have put up a plant for thread and allied products; and works are to be established for assembling bicycles, sewing machines, office equipment and record players. Colombia's first industrial estate is now being built on a 120-acre site near Cali with facilities for 200 small factories. A free industrial zone is to be sited in a slum section of Barranquilla, now being cleared.

The pace of oil exploration and drilling in the country's six oil-bearing areas is quickening, and the new £10 million refinery at Cartagena will have a capacity of 25,000 barrels daily. Municipalities are pressing ahead with various schemes of public works, and with large-scale power schemes under consideration there are openings for "joint venture" enterprises for the local production of electrical equipment.

Colombia still needs to import about 40 per cent of her capital goods requirements, however, and Britain, which last year sold to the country £8.3 million worth of goods, is in a good position to step up her trade with this expanding territory. To take one line alone, there is great interest in prefabricated buildings as a means of solving the country's housing shortage. At present 500,000 rural housing units are required and the number is increasing at the rate of 8,000 a year. Some months ago British suppliers secured a £1 million contract for "Kingstrand" aluminium houses, a design capable of being packed into a box for transport by plane or jeep and erected by unskilled labour.

Supplies of medical and sanitary equipment will be required, and technical items, too, as the campaign to improve educational standards gets under way. The Colombian people are great believers in friendship: it may be well worth while establishing personal relationships with them.



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AUGUST, 1956

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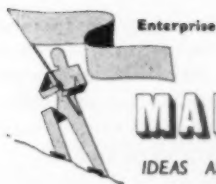
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MARCH OF BUSINESS

IDEAS AND ACTIONS OF FORWARD-LOOKING EXECUTIVES

THE WILL TO WORK

THE importance of training schemes in promoting "the will to work" was depicted very clearly by Dr. C. A. Mace, professor of psychology at Birkbeck College, University of London, when he addressed the Duke of Edinburgh's Study Conference at Oxford recently.

He distinguished between the prickings of conscience on the one hand, and conscientiousness on the other. Of the former he said: "It tells him (the worker) when he is not working hard enough, and it tells him when he works too hard—by the standards of his group. Loyalty to the immediate group is not merely an ideal, it is a practical and potent force. It is indeed a virtue, but like many virtues it carries its own dangers. If the workers' fear of being given the sack by the boss is replaced by the fear of being sent to Coventry by his mates, there will have been no conspicuous advance. Group loyalties are not enough. There is another kind of conscience which operates in a working situation. Conscience, in this sense, it might be said, is what makes a man 'conscientious.'"

Dr. Mace then illustrated the motive of conscientiousness. A skilled surgeon will perform a difficult operation well, regardless of whether the patient is paying a big fee or is receiving benefits from the Welfare State. But although this motive of conscientiousness is seen most clearly in professional pursuits, "once we have seen it there we can see it everywhere." It is "characteristic of all who have received suitable training."

Because the motive of conscientiousness seems to be linked with professional or technical training, it is more likely to be strong in firms where emphasis is put on training. But Professor Mace warns that

"changes in the pattern of motivation cannot be introduced overnight . . .

The changes that are needed are of the sort that commonly come about not by changing persons but by changing personnel; and the most important case of changes of personnel is that which occurs through the succession of the generations."

The professor is pessimistic about the prospects of teaching old dogs new tricks, and says a great deal of useful human energy has been wasted "in the effort to train ageing workers to use new methods of work and to induce old-fashioned foremen to try

new-fangled dodges for the management of men."

If the professor is right, then industry must be content with a limited rate of adoption of new ideas and methods, or else there must be some ruthless demotion of "old dogs" when they get set in their ways, to make room for more nimble young pups.

But surely there must be other ways of dealing with the human situation when older generation clashes with younger. Some of these were pointed out in the first of our new-style picture stories, published

HIGHLIGHTS

OF THIS ISSUE

- ▶ **Will executives' savings and their pension policies be worth much in retirement, if inflation continues? Ways of retaining full value are discussed . . .**
Page 77
- ▶ **New types of British and American sales competitions, in which every representative wins a prize and the wives participate . . .**
Page 84
- ▶ **Plain-language guide to ways in which pressure welding is being developed for repetition work . . .**
Page 89
- ▶ **Question and answer style explains how linear programming can be used to make the most of your production facilities . . .**
Page 99
- ▶ **Advantages of pool typing, with payment-by-results, and by contrast the advantages of individual executive secretaries, are illustrated in two case histories . . .**
Page 107

Next Month

GRADUATE APPRENTICES. How to keep them busy and free from boredom.

CERAMIC TOOLS. Plain-language report on the prospects of a new revolution in the machine tool industry, and how it may affect you.

last month, (page 84). There has been a lot of reader interest in this new type of picture story, in which we present a series of shots from one of the Industrial Welfare Society's film strips, illustrating a certain problem. We then present the views of a few carefully chosen executives and supervisors on how to solve the problem. It is proposed to publish more of these picture stories in future issues.

★ ★ ★

THE Incorporated Sales Managers' Association, in collaboration with the British Institute of Management, will be holding a one-day conference at the Festival Hall on October 9. Theme: "Can we sell our way out of inflation?"

★ ★ ★

GOVT. BACKS ITSELF

THE article on Page 77 points to the difficulties that many executives face in finding ways of investing their savings so that they will retain their value, in spite of inflation. Not only are most executives too busy in their daily work to make a serious study of the art of investment, but also the great bulk of the media for investment by small savers involve lending to the Government. And the value of the money lent continually falls as prices rise.

What is more, investors in many of these media are allowed special privileges. For example, there is no stamp duty on the purchase of Government bonds, as compared with the 2 per cent stamp duty on the purchase of shares in private enterprises, and the stamp duty of from 1 to 2 per cent on the purchase of private houses. Also the new freedom from tax on the first £15 of interest on money deposited in the Post Office Savings Bank or in a Trustee Savings Bank, is not paralleled by a similar concession to money invested in private enterprise. Sir Edward Boyle, Economic Secretary to the Treasury, went out of his way in the House of Commons on June 7 to insist that this new tax relief "should be limited to money lent to the State."

The same attitude in favour of lending to the State and against investment in ordinary shares which might retain their value during inflation, was discernible in the statement of Sir Edward Boyle in the House of Commons on June 25. He then rejected a Liberal amendment to the Finance Bill which would have deferred the income tax on payments made to employees in the form of shares, until such time as the employees sell the shares. He gave as his reason for rejecting the amendment, the plea that ideas for exempting various forms of income, including the exemption of overtime earnings, were always being put forward. And the Inland Revenue felt bound to resist them.

Mr. Arthur Holt, M.P. for Bolton West, pointed out that Sir Edward Boyle had missed the point. The amendment was not designed to claim tax exemption, but merely tax deferment until such time as the shares were sold. This would encourage the holding of the shares as a "nest-egg" for retirement.

Nevertheless, Sir Edward Boyle insisted on rejecting the amendment, without logical reason. This was certainly odd in view of the fact that one of the main innovations in this year's Finance Bill was provision for similar tax deferment in the case of premiums paid under deferred annuity contracts.

The Royal Commission on Income Tax, and in fact the Inland Revenue authorities have always recognised that tax concessions for retirement scheme premiums are not really tax exemptions. They are tax deferments. The Inland Revenue defers collecting the tax until the accumulated fund is paid out in a pension, on retirement.

But of course, as the article on page 77 shows, premiums collected by insurance companies under retirement pension schemes, are for the most part lent to the State. Only about 14 per cent of the funds are invested in company ordinary shares. It was therefore consistent, if not logical, for Sir Edward Boyle to support the deferment of tax on annuity premiums, since the State

would meanwhile be able to borrow most of the money—while he rejected an amendment which would have allowed similar deferment of tax on income invested in private enterprise shares.

If companies were able to give their executives and other employees part of their remuneration in the form of shares, on which income tax was deferred until the shares were sold—as in the United States—such arrangements would provide a useful hedge against inflation. But Sir Edward Boyle, on behalf of the Government, has said "No."

★ ★ ★

DEPARTMENT of Management Studies at the Municipal College of Commerce, Newcastle-upon-Tyne, has prepared a two-week full-time course for middle management, and a three-week full-time course in foremanship and supervision for their next session, starting in September—these among many other courses in a comprehensive programme.

★ ★ ★

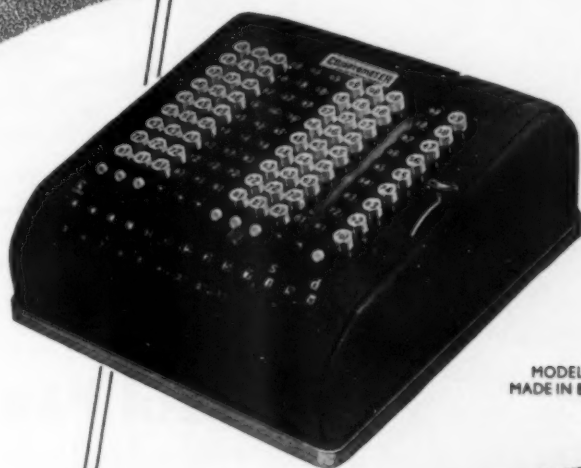
FAMILY PROTECTION

FAMILY protection means at least as much to most executives as provision for retirement. But it is generally much cheaper to protect a family against loss of income, should the bread-winner die prematurely, than it is to provide for retirement income.

The new deferred annuity policies that will become possible, as a result of this year's Finance Act, will generally provide for a return of premiums in the event of premature death of the bread-winner. But if an executive dies fairly soon after taking out a deferred annuity policy, there will be relatively little in the way of premiums to return. Hence the insurance companies are designing family protection policies which dovetail nicely with deferred annuity policies, so that the family is well protected while the annuity fund is being built up.

Short-term life policies, on which there is no return if the person insured does not die during the stated

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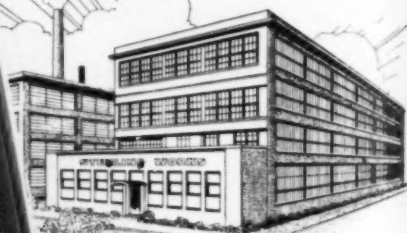
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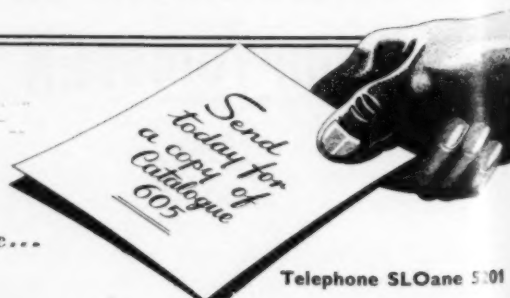
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period, are much cheaper than whole life or endowment policies. For example, whereas it would cost a young executive of 30 something like £24 annual premium for every £1,000 of endowment insurance, he could have £1,000 life cover for a short period of say five years for less than one-quarter of this premium. At his age, the expectation of life is relatively long.

Adapting this principle, insurance companies are arranging to tie in with the deferred annuity policies, "family protection" or terminal life insurance policies which provide cover on a reducing basis. That is, the maximum amount of life cover is provided in the first year, when, if the insured person died, the return of premiums on the deferred annuity policy would be very small. Each year that passes, the amount of life cover is reduced, because the amount of premiums which would be returnable is increased.



THE Mechanical Engineering Research Laboratory, East Kilbride, Glasgow, is to hold its first open days on September 20 and 21. Applications for invitations, stating which date preferred, should be sent to the Director.



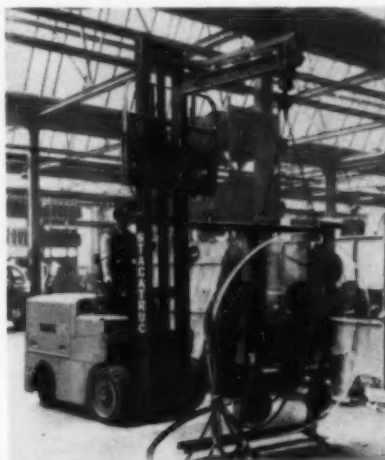
INVOICING METHODS

THE case history method so well known to readers of *BUSINESS* has been used very liberally in a new book on "Invoicing Methods" published by the British Institute of Management (21s.). The book was prepared under the guidance of a steering committee of experts in office management and procedures. Method of treating the subject is to take each main type of equipment used for invoicing, such as typewriters, addressing machines, spirit duplicators and punched card equipment, and to give an introductory general description of how the equipment is used for invoicing, followed by a few case histories chosen from firms with different types of problem.

AUGUST, 1956

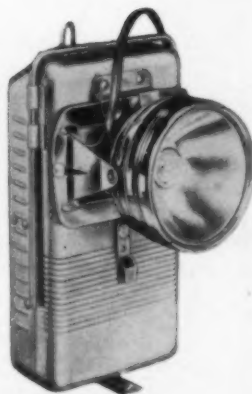
PEOPLE PRODUCTS PLACES I

PRODUCTION CHIEF—This year's president of the Institution of Production Engineers is E. W. Hancock, director and general manager of Humber Ltd. Mr. Hancock, who joined the Institution within a few months of its foundation in 1921, played a leading part in establishing the Schofield Travel Scholarships for young engineers some years ago.



GLASS, WITH CARE

These Triplex window panes for the Ministry of Supply's supersonic wind tunnel at Bedford, each weigh some 1,300 lbs. and presented the makers with an awkward handling problem. The solution, seen here, was a framework carrying pneumatic suction discs which could be moved by fork lift truck.



NO HANDS—An inexpensive but versatile new inspection lamp has been marketed by Chloride Batteries Ltd. The reflector housing can be worn on the forehead by means of an elastic headband, or attached by a clip to belt or buttons, leaving the hands free.

Altogether the book contains 26 case histories, and of course there are supporting chapters to tie up the whole picture.

★ ★ ★

THIRTY guineas is the price of the Dale Carnegie Course in Effective Speaking and Management Training, now being conducted in 14 weekly evening sessions at St. Ermin's Hotel, London. It is said to give greatly increased confidence and ability to deal with people, to those who have all the knowledge and technical skill, but who wonder why others less qualified get the best jobs.

Letters

The Editor, BUSINESS
Sir,

May I congratulate you on your excellent article on 'Management Consultants'! I found it a very fair and lucid explanation of a field which for many reasons as you remark, tends to be shrouded in secrecy.

My experience both as a consultant and as a research worker, has given me the opportunity of working alongside consultants from Scandinavia, America and Britain. While it has been interesting to compare different methods, policies and ethics, there appears to be in all countries (and my work has been largely abroad,) a real need for consultants to get together informally and review their own methods and policies.

In this country, responsible consultants with the help of the B.I.M. are doing much to avoid past mistakes and build up a professional status; an example which could well be followed elsewhere. While there is good justification for professional silence with regard to clients, we should not allow this to impede objective examination of our own activities as consultants. There are indications that the air is clearing and your article is a valuable contribution in this direction.

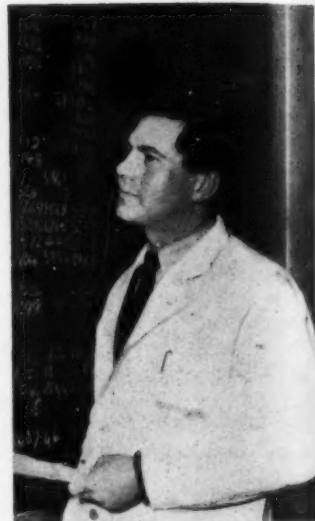
S. D. M. KING

London, W.1.

PEOPLE PRODUCTS PLACES 2

YOUTH AT THE HELM —

Smedley's Ltd. announce the appointment of 27-year-old Dennis Eley as manager of their Coupar Angus, Scotland, canning factory. Mr. Eley is a graduate of Southampton University. He joined the firm only six years ago as a trainee.



BETTER SERVICE — Britain's car industry is often criticized for neglecting some of its overseas customers. Now the Standard Motor Co. Ltd. have opened this European Service School at Nessonvaux-Lez-Liege, Belgium, to give repair and maintenance instruction to mechanics from six countries. All the latest instructional aids are being used, and interpreters are in constant attendance.



FOOD WITHOUT FRILLS — A corner of the new directors' dining room at the engineering factory of Savage and Parsons Ltd., Watford. The elegant but distinctly ascetic furniture, covered in vynide over foam rubber, was designed by Ian Henderson. Does it reflect a vogue for a no-nonsense approach to executive amenities?

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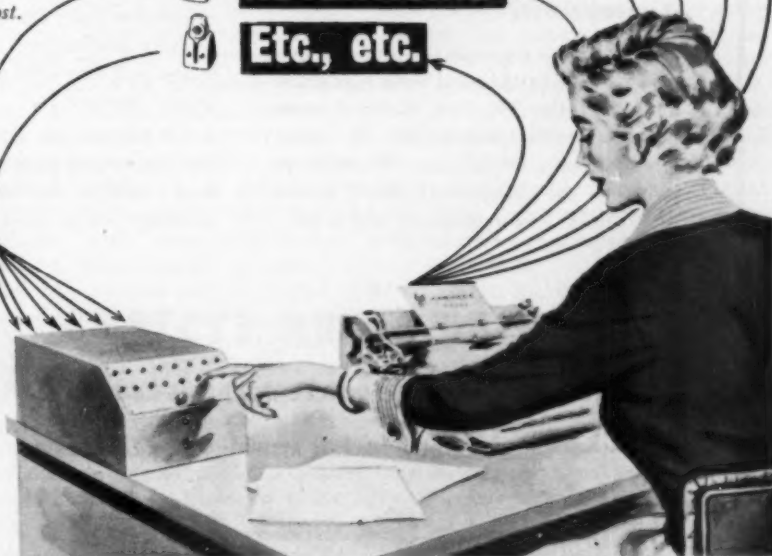
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TALKING POINTS

EXECUTIVE LIVING STANDARDS

Who Gains from these Cheer-up Tales?

THE journal "Trend," prepared by the Economist Intelligence Unit for one of the leading advertising agencies, has published an article attempting to refute the broad conclusions of "The Squeeze on Executive Living Standards," published in BUSINESS last March. This attempt is made in a rather odd way—by assuming a rosy outlook for the average wage-earner, and then producing figures which show that, although executives will not necessarily do so well as wage-earners, they may not do so badly.

In the BUSINESS article last March, the forecast of reduced living standards for executives was based on two very clear assumptions—that inflation continued and that tax rates remained the same. Everyone hopes that inflation will be stopped and tax rates reduced, but the purpose of the article was to show the cumulative effect, over the years, of continually postponing the attack on inflation, and continually postponing real reductions in tax for the higher income groups. Each year, the nibble is not very great, but by taking a 25-year period, it was possible to produce some most alarming figures which woke a lot of people up. Many readers of BUSINESS sent copies of the article to their M.P.s.

The grim outlook for executives if inflation continues and tax rates remain unchanged, was contrasted in BUSINESS with the prospect held out by Mr. R. A. Butler that the nation might double its standard of living in the next 25 years. We did not assume that British workers will double their standard of living in the next 25 years, and in fact we published a comment by Sir Ronald

Weeks (later Lord Weeks) saying: "unless business executives are offered the prospect of rising standards of living, when they receive promotion to positions of greater responsibility, the nation must say goodbye to all dreams of prosperity."

Now, however, "Trend" has stood logic on its head by assuming that the average worker will double his standard of living, and then showing that this will mean tax concessions, etc., which will also benefit executives.

The task of an editor is to try and interpret the needs of his readers. "Trend" suggests that the figures published in BUSINESS "can only lead executives to feel unnecessarily depressed about the future." From this we reluctantly conclude that the editor of "Trend" regards his readers as a lot of down-in-the-mouth old sad-eyes who need cheering up. This impression is strengthened by the announcement that his article commenting on our statistics is the first of a series of "Tired Businessmen's Tales." Presumably there are to be more cheer-up messages.

By contrast, the readers of BUSINESS are made of sterner stuff. They would not bother to read BUSINESS unless they were men of action, always on the look-out for new points and new ideas. Their reaction to our article last March was one of ferment rather than depression. They got busy, writing to M.P.s, talking and persuading, to have a wrong situation righted.

THE OFFICE★

Does it Provide a Worthwhile Career?

THE Office Management Association's seventh survey of office

workers' wage rates* naturally confirms that there is a gross shortage of school leavers entering the office—but it also shows why. To the young person launching into a new career, an office job just does not appear worth it in the long run.

In the past decade, junior clerks have had increases totalling 131 per cent on the 1946 wage, while the most senior and responsible clerks have received an increase of only 39 per cent. Allowing for adjustments which take into account a rise in prices of 53 per cent in the same period, and a rise in the national income *per capita* of 22 per cent, the purchasing power of the junior's weekly pay packet has risen by 56 per cent, while his responsible senior has suffered a drop of 36 per cent.

Parents, who may know well how "old Smithy, the something in the City down the road" is struggling to keep up to his pre-war standards, do not have to peruse any reports to advise their children against going into an office. After all, in the hierarchy of social classes, clerks are usually placed above, say, the police. But a police constable starts at something like £9 per week, and can rise to £12 10s. There is no such assurance in the office. It is clear that most clerks have not shared fully in the increased prosperity of the country since 1946.

Also, the figures for the junior grades of clerks are a trifle misleading since a much higher proportion of the lower grade of clerks today are adults, compared with 1946, because of the shortage of school leavers.

The figures also show that whereas women clerks' salaries seem on the average to have kept in step with increases in manual workers' wages, men clerks are earning something in the region of thirty shillings a week less than their shop floor counterparts.

* Clerical Salaries Analysis, 1956. (Office Management Association, 30s.)

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The Outlook for EXECUTIVES' SAVINGS

By GEORGE COPEMAN

Most executives are too busy to invest their savings wisely. Hence inflation can catch them reaching retirement age with savings—and perhaps a deferred annuity pension—of greatly reduced value. This article aims to help them hide their pennies in the right type of mattress, so that they will be worth something later on

IN the March 1956 issue, BUSINESS published figures showing how executives are being "squeezed" between the rising cost of living and high tax rates. Many find that their standard of living is going down, in spite of promotion to higher salaries. If such is the outlook for executives' living standards while they are at work, what of their prospects when they stop working? What chance have they of saving sufficient for retirement, and of ensuring that their savings maintain sufficient purchasing power to give them a comfortable retirement?

This article is concerned primarily

with the problem of trying to defeat the effects of inflation. It is, of course, the policy of the Government to stop inflation. But prices have been rising at an average annual rate of around 5 per cent since before the war, and although the Government is taking a number of measures to try and halt inflation, there is no certainty yet of permanent success. Moreover, many economists believe that even if the more rapid inflation of late is defeated, we cannot have full employment without an average annual rate of inflation of perhaps 3 per cent.

The problem of protecting person-

al and family savings against inflation has become more widespread in the last few decades, because Government finance has become so dominant. The major media for investment now are Government securities (over £18,800 million British and Commonwealth, on the London market) and National Savings (over £6,100 million). But money lent to the State depreciates in value as prices rise.

By contrast, a very popular form of private investment before World War I was house property. A middle class person, saving for retirement, might buy a few cottages with the idea of living on the rents in old age. And if the cost of living went up, he could restore his standard of living by raising the rents. But rent control has made this form of investment foolhardy. It has brought poverty to many a middle class couple who had saved what seemed sufficient for their old age. It has destroyed a most valuable form of security for middle class savings.

Another reason why the problem of protecting personal and family savings against inflation has become more widespread, is that the middle class today is more largely composed of salaried executives who have no great experience of private investment, or indeed of private saving for professional or business purposes.

Whereas the small businessman or even the professional man must save out of income if he is to expand his

Effects of Inflation

The junior executive aged 30, and earning say £1,000 a year, who takes out a deferred annuity policy and pays premiums of 10% of his salary, can look forward to a pension of around £690. But if inflation were to continue at 3% per annum, nearly one-third of the value of the pension would be destroyed, even if he periodically "topped up" his pension policy with additional premiums, when he received promotion.

The more senior executive aged 40, and earning say £2,000 a year, could expect a deferred annuity pension of around £750. But inflation at 3% per annum could be expected to destroy one quarter of the value.

business, the salaried executive does not have to. He can have a most successful career climbing the ladder of promotion inside a medium-sized or large firm, employing the capital of others but never being required to put any of his own savings into the business.

Contractual Savings

A major part of executive saving today is contractual—that is, the executives save for specific objectives, to which they bind themselves and make regular payments. Even hire purchase provides a form of contractual saving, in the sense that the person who buys a motor car or furniture on hire purchase pays off the goods fairly rapidly and thus increases his net assets.

Likewise, the purchase of a house by taking out a mortgage and paying it off is an important means of saving. In fact, one of the odd quirks of inflation is that the executive who receives promotion to a higher standard of living and wants to *save* more, must seriously consider *spending* more by living in a bigger house.

For although, as mentioned earlier, house property that is rented to others can be an extremely bad investment, house property that is owner-occupied can be an extremely good investment. It is not subject to any kind of rent or price control. Owner-occupiers are too numerous, politically, to be controlled.

It does seem odd that one way for the rising executive to save is to spend more on his house. But this is surely true. Those who took out mortgages before the war on houses that were then worth £700 to £1,000, have since found that their houses have risen in value to something like £2,500 to £4,000. But they have only had to pay off the original mortgage. Therefore they have gained considerably in assets.

Taking a lesson from this experience, it would seem that as an executive rises up the salary scale, it pays him to buy a more expensive house, take out a larger mortgage to pay it off, and thus gain more through inflation. He cannot, of course, do this if his company provides him with a house. But then he should

consider saving in some other way, and he must put his savings into something which will not "go bad" with inflation.

During a period of inflation, those who borrow, gain. We have seen that the executive who buys a house on mortgage is gaining in assets. By contrast, the most common method of providing for retirement, by paying premiums on life insurance or contributing to a pension policy, involves lending. And in a period of inflation, this means losing. The premiums paid to the insurance company or pension trust are mostly invested in Government bonds or in mortgages. A survey made by the *Economist* shows that last year 42 life insurance funds, controlling over four-fifths of all life insurance assets, had 77.2 per cent of their life funds invested in Government securities, mortgages and other forms of "money investment." Only 14.3 per cent was invested in ordinary shares, representing the real assets of industry, and only 8.3 per cent in real estate. Thus in most cases it cannot be expected that the bonuses paid by insurance companies to policy-holders, as a result of rising "profits" on investment, will be large enough to compensate policy-holders for the falling value of money.

This is not mentioned for the purpose of frightening people away from insurance and pension policies. Such policies are necessary and extremely desirable. But it is worth having a look at just how much of the value of a future pension is likely to be destroyed by inflation during the working life of the executive. Just how poor is he going to be after a lifetime of striving and saving? And if he is likely to lose, through inflation, a major part of the value of his retirement pension, is there anything he can do now to avoid this potential loss?

New Pension Provisions

These questions are particularly relevant in view of the new pension provisions made in this year's Budget. It is broadly true to say that under these new provisions, the tax concessions previously granted to those

who belonged to a pension fund run by their employers, are now given to the self-employed and to employees who are not members of a pension fund.

These tax concessions are substantial. For on an ordinary life insurance premium, the tax allowance is only two-fifths of the rate of tax payable, and of course there are no allowances at all for surtax. But under a company staff pension scheme, and under the new provisions of this year's budget, the whole of the premium on a policy may be allowed as an expense before assessing income for tax.

There are restrictions on the type of policy to which the concessions apply. It must be a deferred annuity policy providing, in the general case, a pension at age 65. It cannot be commuted for a lump sum in cash. Nor can it be assigned or transferred to another party. So it has no surrender value, and it cannot be used as collateral for a loan.

The pension, when paid, will be taxable as earned income. During the build-up of the annuity fund, the income it earns will be tax-free.

Those who already belong to pension schemes in which the final pension will be a fixed proportion—say one-half or two-thirds—of final salary, are of course largely protected against the effects of inflation. For presumably their salaries will go up with inflation, and their employers will pay correspondingly larger premiums to "top up" their pension policies. But we are mainly concerned here with how executives can themselves make provision for retirement.

What sort of value will a deferred annuity policy have when the executive who has paid premiums for many years, does retire, if inflation has continued throughout his working life? As we have seen earlier, inflation has in recent years been continuing at an average annual rate of 5 per cent. It may decrease, but if full employment is to continue, it may not fall below 3 per cent per annum. Therefore in the calculations which we are about to give, we will assume two different rates of inflation—5 per

cent and 3 per cent.

We will also assume that if inflation is at the rate of 5 per cent per annum, the enterprising executive will receive increases in salary which throughout his working life average $7\frac{1}{2}$ per cent per annum. In the case of inflation at 3 per cent per annum, we will assume that the enterprising executive receives salary increases averaging 5 per cent per annum.

Two Typical Executives

We will consider two typical executives, one a junior at present 30 years old and earning £1,000 a year, and the other more senior, at present 40 years old and earning £2,000 a year. In the first case, deferred annuity premiums can be paid for 35 years at a rate of £100 per year. In the second case, they can be paid for 25 years at the rate of £200 per year.

If these executives receive salary increases, it will be possible in subsequent years for them to take out further deferred annuity policies to bring up the total of premiums paid to the allowable 10 per cent of income.

The minimum annuity premium is £10, so it may not be possible for an executive to take out a further annuity policy every year he has an increase in salary. And in practice he might not be so conscientious. Therefore it would be more realistic if we assumed that each executive started off his pension plan by spending the full 10 per cent of his salary on premiums, and that he reviewed the situation every five years, taking out a further policy then to bring his

payments up to the permitted 10 per cent.

Let us first consider what happens when salaries rise by 5 per cent per annum, and prices by 3 per cent. Looking first at the executive who starts his deferred annuity policy when he is 30 years old and his salary is at £1,000 per annum, after five years we find that his salary has risen to £1,275. After ten years it has risen to £1,680. And so on, until after 35 years, when he is on the point of retirement, it has risen to £5,520. The original premium is £100, and he pays this for 35 years. Five years later he takes out an additional policy with a premium of £27, and pays this for 30 years. Five years after that he takes out an additional policy with a £35 premium, and pays this for 25 years, and so on until he is 60, when he takes out his last policy with a premium of £94 per year for five years.

In this calculation we are using deferred annuity tables provided by a well-known life insurance company. They assume that the final annuity is guaranteed for a minimum period of five years, and that there will be a return of premiums on prior death. In the Committee stage of the Finance Bill, the Chancellor introduced an amendment allowing premiums to be guaranteed for ten years, but the general trend of these calculations would be the same, whatever the details of the deferred annuity policy.

From the annuity tables provided, it can be calculated that the annuity payable on retirement, for the original £100 policy, would be £455. To

The Long Island Lighting Company has its pension fund in two parts. One is computed actuarially, and invested in gilt-edged. Thus each employee knows in advance that he can expect a basic pension of so many dollars. The other part is invested in common stock, and employees are issued with "benefit units," like the stock in a unit trust. These provide a hedge against inflation

this must be added bonuses of £238 per annum, if the company concerned continues to pay bonuses at its present rate. For the second policy, taken out five years later, the annuity would be £95 10s. and the bonuses £36. For all the policies taken out, the total annuity would be £923 10s. and bonuses £376. Thus there is approximately a £1,300 retirement pension in prospect for the junior executive of 30, with an income of £1,000 per annum now, who takes out an initial deferred annuity policy up to the maximum amount permitted, and who "tops up" his pension provisions every five years, to take account of rising income.

What will this annuity be worth? The original policy he took out, as mentioned earlier, provided for an annuity of £455 with prospective bonuses of £238, making a total in prospect of £693. After tax at the existing rates, this would give the same standard of living, at today's prices as £621 10s. salary. But if we assume prices are rising by 3 per cent per annum, when the executive retires his cost of living will be 2.74 times its present level.

40% Loss of Value

His final £1,300 annuity, after tax (assuming that his children and other dependents are then "off his hands") will be £1,022 10s. net. And in terms of today's cost of living it will be worth £373. This is 60 per cent of the original expected retirement pension—expected when he was a young executive of 30 earning £1,000 a year.

The addition of all the subsequent annuities, taken out every five years, has not helped him to defeat inflation.

Now let us look at his position if his salary goes up by $7\frac{1}{2}$ per cent per annum and prices rise by 5 per cent. The total of annuities and bonuses due to him on retirement will be £1,917.

This will be worth £1,445 10s. net after tax, assuming he has no dependents then. But the cost of living will have risen to 5.52 times its present level, and therefore his annuity will be worth net, after tax, £262 in terms of today's money.

This is in contrast to an expected £621 10s. net, and so his pension has fallen to 42 per cent of the original.

We now turn to the executive aged 40, with a salary of £2,000 per annum. We will assume in the first place that his income rises by 5 per cent per annum and that prices rise by 3 per cent per annum. His final total of annuities plus bonuses will be £1165, which is equivalent to £1,025 10s. after tax. As prices over the 25 years during which he is saving for retirement will have risen to 2.09 times the present level, his annuity will be worth £490 in terms of today's money. But having saved for only 25 years, the annuity that he originally expected would be only £750 gross, or £723 10s. net after tax. Thus, his final pension will have retained 67 per cent of the original value expected. It can therefore be seen that the person who is saving for a shorter period and is saving more of his income in later life, suffers less from inflation.

Now let us assume that the £2,000 executive has salary rises averaging $7\frac{1}{2}$ per cent per annum from age 40 to 65, and that prices rise by 5 per cent per annum. His final total of annuity and bonuses will be £1,491, and this is £1,245 5s. after tax. But prices will have risen in the 25 years to 3.39 times their original level, and his pension will have retained 51 per cent of its original value.

Perhaps we should not have assumed that an executive's salary rises by an average of, say, 5 or $7\frac{1}{2}$ per cent throughout his entire career. For many executives there is a plateau, which is reached considerably before retirement.

What would be the position, therefore, if we assumed that executives got no salary increases during their last ten years, from 55 to 65? The figures show that this would have a relatively small effect on the final pension, because only one annuity—that taken out at 60—would have to be cancelled from our calculations.

Here are the relevant figures. For the £1,000 executive starting to save for retirement at the age of 30, when prices are rising by 3 per cent per annum and his salary is rising by 5

per cent per annum up to the age of 55, the pension will be 59 per cent of the original expectation, as against 60 per cent if he were to continue to get promotion up to retirement.

For the £1,000 executive, whose salary rises by $7\frac{1}{2}$ per cent per annum up to the age of 55, with prices rising by 5 per cent per annum, the final pension will be 41 per cent of the original expected, as opposed to 42 per cent if he had taken out a final policy at 60.

For the £2,000 executive whose salary is rising by 5 per cent per annum up to the age of 55, the final pension will be 65 per cent of that expected, as against 67 per cent if he had taken out the final policy. If his salary is rising by $7\frac{1}{2}$ per cent per annum, his final pension is 47½ per cent of the original, as against 51 per cent if he had taken out the final policy.

In these calculations, we have assumed that tax rates remain unchanged. But if inflation continues, there will surely be tax concessions which benefit retired executives, even if those still working are hard hit. As we cannot even guess at the extent of these concessions, the best way we can provide a more optimistic view of future pensions is to leave taxation out of the calculations, and to compare gross pensions.

Doing this, we find that, under 3 per cent inflation, the £1,000 executive's pension retains 68½ per cent of its value, instead of the 60 per cent calculated in the first column of this page. Under 5 per cent inflation, his pension retains 50 per cent of its value, instead of the 42 per cent previously calculated. The £2,000 executive, under 3 per cent inflation, retains 74 per cent of his pension, instead of only 67 per cent, and under 5 per cent inflation, he retains 58½ per cent, instead of only 51 per cent.

Disappointing Figures

The figures presented so far, though disappointing, are not bad enough to discourage executives from taking out policies under the new pension provisions, even if inflation continues.

In no case will the final pension be worth less than 42 per cent of the figure originally anticipated, even though prices will have risen to two, three or even five times their present level. The prospect for executives' retirement is in fact not quite as grim as the prospect for their standard of living while working, because taxation does not greatly affect the retirement position. In fact the premiums for deferred annuities will be tax-free, and of course the retirement incomes calculated here are much lower than the previous working incomes, and therefore fall into lower tax brackets.

Great Tax Savings

The tax saved on his deferred annuity premiums by the £1,000 executive whose salary is rising by an average of 5 per cent per annum, is approximately £4,350. The total premiums paid are £8,160. Thus the net premiums paid by the executive are only about £3,810, or 46½ per cent of the gross premiums. Therefore he has not so much to complain about if his final pension is worth only 60 per cent of what he had expected. By tax concessions, the State has more than made up for the loss due to inflation.

The other examples calculated here show the tax concessions in an even more favourable light, because the incomes concerned rise to higher levels. The £1,000-a-year, 30-year-old executive whose salary rises by 7½ per cent per annum finds that his net premiums, after allowing for tax saved, are only 24½ per cent of the gross premiums, while his final pension is worth 42 per cent of the original.

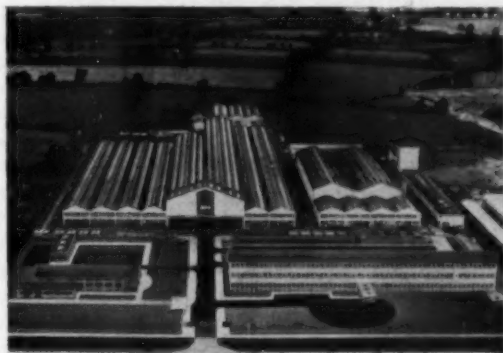
The £2,000 executive whose salary rises by 5 per cent per annum from age 40 finds that he is really himself paying only 36½ per cent of the total premiums, and his final pension is worth 67 per cent of the original. The £2,000 executive whose salary rises by 7½ per cent per annum finds that he is really paying only 25½ per cent of the total premiums, and his final pension is 51 per cent of the original expected.

Nevertheless, when an executive has had a lot of promotion over the



SOME GAIN, OTHERS LOSE

When an executive puts his "nest-egg" into National Savings or into gilt-edged securities, and the public authorities use the money to build fine schools like the above, this represents a wonderful investment for the next generation of young children. But if inflation continues, this investment will become a cause of poverty in old age for the executive who has lent good, hard-earned pounds to the Government and later, in retirement, is repaid with depreciated currency



BUT ALL CAN GAIN

By contrast, when an executive puts his savings into company ordinary shares, and his money is used to build fine new factories like that above, he helps the next generation to earn a higher standard of living, and he also helps himself. For there is a good chance that his savings will retain their value during his old age, in spite of inflation

years, and has been increasing his pension policy contributions every five years, he expects his final pension to bear some relationship to his final, not his original income. Is there not, therefore, some way in which the executive who is saving regularly for retirement can put his savings into a form that may be expected to retain its value?

Try Ordinary Shares

It is well worth looking at company

ordinary shares. Even though these fluctuate in value, the general trend of dividends in recent years has been markedly upwards. Last year ordinary dividends were 95 per cent above the 1938 level, and although prices had risen in the same period by 142 per cent, dividends were a much better hedge against inflation than the fixed interest on bonds. Moreover, in the last few years dividends have been catching up some of their wartime and post-war lag, rising even faster than prices.

The chief prospect of security in retirement for some executives and other members of the middle class seems to be in getting part of their pension savings out of fixed-interest investments into ordinary shares. In recent years the insurance companies have been doing just this with their policy-holders' funds. But they are unlikely to go far in this direction. As mentioned earlier, at present insurance companies have on the average only about 14 per cent of their life funds invested in ordinary shares—though some companies have as much as 30 per cent. An executive who is planning to take out a deferred annuity policy may, therefore, find it advisable to ask his insurance broker for the names of companies with a considerable proportion of their funds in ordinary shares.

Nevertheless, insurance policies are written in terms of pounds sterling, not in terms of stock units, and it is therefore unlikely that many insurance companies will dare to put a major portion of their funds in ordinary shares. They have, after all, definite obligations to pay out pounds sterling to their policy-holders—however depreciated the pounds.

A way out of this problem has been found in the United States. There, a number of companies have split their pension funds into two parts. Among the pioneers of this movement was the Long Island Lighting Company. One part of this company's pension fund is computed actuarially, and each employee knows in advance that on retirement he may expect a certain basic pension of so many dollars. For the other part, the contributions are invested in common stock, and the employee is issued with "benefit units" like the stock units in a unit trust. These may be expected to appreciate in value over the years, and so increase the fund from which the other part of his pension may be provided.

Thrift Plan Units

In Britain, the only known equivalent service is provided by Municipal and General Securities Company Ltd.

London, E.C.4. They started a "thrift plan" in October 1954, under which any person may sign an application form agreeing to save at least £10 a year. So far over 2,750 have signed.

The savings can be sent in in regular instalments of 5s. or more, or in one annual lump sum, or at irregular intervals, as desired. M. and G. keep something similar to a bank account for each client, and they provide a "bank statement" every six months, giving the position of each customer's account.

Customer's Account

The money received is invested in trust units, as and when there is sufficient money available in each customer's account to buy at least one unit. All purchases of units are entered in the customer's account, and any cash balance is carried forward. Dividends on the units are also entered, net of tax, in the account. Thus they are re-invested in units, and are not paid out in cash.

Each six months the customer receives with his statement of account a "Summary of Certified Holdings"—a handsome certificate—telling him how many units he holds and their market value. This value fluctuates daily, of course, because the money invested by customers in trust units is re-invested by M. and G. in ordinary shares quoted on the Stock Exchange.

For the small saver, the great advantage of the unit trust system is that it enables him to spread his risks. Whereas it would cost him thousands of pounds to buy enough company shares to spread his risks, if he went direct to a stockbroker, he can leave the job of risk-spreading to a unit trust like M. and G., just buying their units one at a time, as and when he saves the 30s. or so that they cost.

As with many other trusts, the value of M. and G. units, and the dividends on them, have been rising in recent years. The M. and G. General Trust Fund, for example, paid a dividend of £4 7s. 6d. on its

units in 1951, and in 1955 paid £7 15s. This is a rise of 77 per cent. During the same period, retail prices rose by only 3 per cent.

Savings invested in M. and G. units must come out of net income after paying tax, and the dividends entered into each M. and G. account are net of tax at the standard rate.

However, there are some grounds for hoping that the directors of M. and G. may be able to get the Finance Act, 1956, so interpreted by the Inland Revenue that after suitably altering the Articles of their trust companies, their Thrift Plan will carry the same tax concessions as have been provided for deferred annuity policies.

To make this possible, it would seem likely that a customer's accumulated savings under the M. and G. Thrift Plan would have to be invested in an annuity when he retired, and the savings would have to be non-withdrawable until retirement.

If inflation continues, an investment in M. and G. units may provide a better pension than a deferred annuity policy, even if the M. and G. investment is not granted any of the tax concessions allowed for deferred annuities. But if the tax concessions are granted, then there is a prospect of making sufficient gains on an M. and G. investment to compensate for the depreciation in value of a deferred annuity policy. The two should run side by side, rather than put all the eggs in one basket.

Changing Public Attitude

The need for finding means of protecting executives' savings against the effects of inflation may well alter the public attitude towards financial matters in the years to come. In Britain there are only about 1½ to 2 million ordinary shareholders, and it has long been considered by the more forward-looking members of the C.I.F. that the only way to protect the financing of private industry from ignorant and prejudiced political attack, is to widen the spread of shareholding and encourage more people

STATEMENT

THE 'M & G' THRIFT PLAN

A. BLANK, ESQ.,
79, EASTWAY AVENUE,
MILNERS

Manager: MUNICIPAL & GENERAL SECURITIES CO. LTD.
8, CLOAK LANE,
LONDON E.C.4.

TEL. CITY 1001

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SHARE INVESTMENT WITHOUT TEARS?

The "M & G" Thrift Plan enables an executive to save by instalments and have the money invested in trust units, backed by ordinary shares. Every time he sends in an instalment, he receives a tear-off strip showing the amount paid in, the trust units bought, the price paid and the cash balance carried forward. Every six months he receives a statement listing each of these transactions, and also a "certified summary" telling him how many trust units he owns, and their market value.

to own ordinary shares.

However, inflation has now put the boot on the other foot. Private enterprise may need protection from political attack, but executives and professional men are in even greater need of protection from inflation.

It is no longer a case of City men having to say: "Please, Mr. Executive, buy some of these ordinary shares and help to defend private enterprise from attack." When enough executives become aware of how inflation is impoverishing their retirement prospects, they may want to ask: "Please, Mr. Private Enterprise, how can I buy some of your shares to protect my future?"

Many firms which run their own pension funds, invest part of the fund in ordinary shares, including those of their own company. But this is generally only a small part, for the same reason that insurance companies hesitate to invest a large part of their funds in ordinary shares. The future pensions are, after all, calculated in money terms.

But how different would be the position if the fund were divided into two parts, one for gilt-edged investment and the other for ordinary shares. Many firms with long-standing pension funds are continually having to "top-up" the fund out of profits, because the contributions of

senior members of the staff, made long ago, have depreciated in value. Here is what Lord Hives, chairman of Rolls-Royce Ltd., said in his statement to shareholders last June:

"Last year I referred to the company's pension schemes and explained the necessity for an appropriation to deal with a large body of employees who, because of their age or conditions of past service, required special consideration. There are still a number of older workers whose benefits under existing schemes have been drastically reduced in value by the progress of inflation, and for whom it is the practice to grant additional pensions. To meet existing and future cases of this kind, an amount of £250,000 has been charged in this year's accounts."

A company as prosperous as Rolls-Royce can perhaps afford these peri-

odic supplements to their pension scheme. But some companies cannot. In any case, why should they permit this drain on earnings to continue, merely because the great bulk of their pension funds are invested in gilt-edged securities?

The day has surely come when companies will have to consider seriously running their pension funds in two parts, like the Long Island Lighting Company, one part invested in gilt-edged and the other in ordinary shares. Likewise, executives who set aside their own savings for the future will have to consider backing two horses—one a deferred annuity policy, and the other a "thrift plan" scheme invested in unit stock.

THE "M & G" THRIFT PLAN

Manager: MUNICIPAL & GENERAL SECURITIES CO. LTD., 8, CLOAK LANE, LONDON E.C.4.

THIS IS TO CERTIFY that on Monday, 16th April, 1956—

A. BLANK, ESQ.,
79, EASTWAY AVENUE,
MILNERS

has received the beneficial interest of 100 units of THE "M & G" THRIFT PLAN, registered in the name of Municipal and General Securities Company, Limited (Thrift Plan Account), as nominee, and a cash balance of £100.00.

The price of Units on that date, as quoted by the Manager, was 10s. 6d. — 10s. 6d. offered.

For and on behalf of the Manager, MUNICIPAL & GENERAL SECURITIES COMPANY, LIMITED

Sales Move Faster with these NEW-STYLE INCENTIVES

By STEPHEN ROSE

Traditional sales contests cater only for the above-average man in a firm. Now ingenious new schemes have been devised to reward each participant according to his level of achievement. Two case histories here, one from England and the other from America, show that sales can increase by as much as 500 per cent, morale is high and wives are happy in competitions where everyone wins

FEW average athletes consider it worth the effort to compete in an Olympic event, and few average salesmen exert themselves to the full in a sales contest where it is perfectly obvious that Smith or Brown will walk off with the loot as they have done with unfailing regularity for the last fifteen years.

Even where a sure-fire winner may not be apparent from the outset, it is usually a matter of only a fortnight or so before an accurate guess can be made. In a six-week contest, this means that even if everyone starts off full of zest and keenness, for two-thirds of the time it is going to be just a three-, two- or one-man show. Bloggs or Cholmondeley may bask in Riviera sunshine, but a hundred others will merely return to their old routine muttering that since Bloggs and Co. had the best accounts anyway, it seems a bit thick that they should restore their tissues at the firm's expense.

For this reason, the new approach to sales contests attempts to spread the butter more evenly. In contrast to the old school, which battled for

first, second and third places, the new idea is to give as many people as much incentive for as long as possible. The optimum way of doing this is, of course, to allow *everyone* to win. But a sliding scale of awards must ensure that each man still wins only according to his merit.

We publish here two case histories of firms that have devised contests

along these lines. One comes from America, and may appear at first sight to be on rather a lavish scale. But its basic principles can easily be adapted for smaller firms or more limited budgets. The other is English, and makes most stimulating use of the new approach in question.

Johnson's Wax Products Ltd., the West Drayton, Middlesex firm, make not only polishes for the household, but also maintenance products for industrial and commercial users—factories, canteens, offices, etc. These latter sales are handled by a maintenance division, which has held sales contests quite regularly for a number of years. But the company's sales team has for some time been aware of the disadvantages of the stock competition, and therefore decided to do something unconventional and different for the spring promotion this year.

Salesmen, more than most people,



An Austin Reed representative was given five minutes in which to put across the desirability of the prizes. Undoubtedly the nature of these played an important part in the competition's success.

I HEAR THAT —



"... Mr. Blank has booked his biggest order yet: 200 gallons of wax polish. Nice points value." Simple little announcements like this from the Whispering Men kept Johnson's scheme full of life

tend to be clothes conscious, as so much depends on the first impression they make. But in these hard times few people can drop in at their tailor's quite as often as they might like to do. Johnson's therefore hit upon the idea of having items of good quality clothing as prizes. Why not, they reasoned, find some way of assessing each man's sales effort during the period of the contest, and relate certain levels of achievement to certain items of clothing? Would this not, in fact, provide incentives for every type of salesman?

The firm contacted Austin Reed Ltd., the London and provincial men's wear firm, and discussed this plan with them. They, not unnaturally, were well pleased with the suggestion, and agreed to co-operate to the full. For a start, their marketing experts were able to advise on the relative prize value of the various items on the list. They held that a bespoke suit should be at the top of the scale, followed by a sports jacket and flannels, a raincoat and so on down to a tie. With a touch of malice, they added a handkerchief ("for the loser to cry into"), but in the event this was not awarded.

With this the contest began to take shape. All the products handled by Maintenance Division were allotted points values (so many points per gallon or per dozen sold to a new account, and so many for an old one). Then the organizers worked out how many points the average salesman would earn on this basis in

a normal six-week period, and determined the points rating of each item of clothing accordingly.

For instance, a bespoke suit was assessed at 2,000 points, sports coat and flannels at 1,500 and raincoats at 1,000. At the bottom of the scale came ties at 200 and socks at 100. It will be apparent how this scale was able to keep everyone's interest alive right to the end, as a final spurt in Week Six could still make all the difference between a hat and a pull-over, or a pair of shoes and a sports jacket.

The contest was launched with some skill at Johnson's annual sales conference in London. The sales manager put across the basic idea with illustrated charts and visual aids, and showed how the scheme would work in practice. He stressed especially the fact that this contest was not competitive in the usual sense. There was no restriction on the number of suits or coats available, he said, and in fact the firm would be delighted if *everyone* qualified for a top prize. He also explained that there was to be a simultaneous contest for the best sales district, based on aggregate points scores from the individual competition. Each salesman in the winning district would be presented with a silk tie.

Then a senior representative of Austin Reed's was given five minutes in which to "sell" the clothes his firm was to provide. For this purpose he had brought with him dressed tailor's dummies and sample merchandise.

Within the allotted time he had succeeded in arousing considerable enthusiasm for his wares.

To coincide with the opening of the contest, a new product was launched. It was a cleaner of almost universal application, and meant that representatives would have to spend time putting it across on *every* call, instead of selling as much from established lines as they could, and moving on quickly. In fact, anyone adopting the latter method in the contest would find themselves with a very low point score, as the new product was rated considerably higher than existing lines.

The sales conference over, every salesman was sent a little card from Austin Reed, wishing them good luck in the competition. And with that, the battle was on.

Six weeks later it was quite apparent that the success of the competition was going to be beyond all hopes. It had been thought that rating a suit at 2,000 points was, if anything, rather high. But in actual fact no fewer than six men qualified, and with points to spare. The top men were so far above the required figure that extra prizes were instituted: one pair of nylons would be sent every month for a year to the wives of those that scored 3,000 or above. For anyone with 4,000 or over this was increased to two pairs a month.

In addition to the six suit-winners, seven others won sports coats and flannels, while the inter-district re-

Salesmen tend to be more clothes conscious than most people. It was therefore decided to award prizes by relating certain levels of sales to certain articles of good quality clothing

Additional prizes were instituted: wives of those scoring over 3,000 points will be sent a pair of nylon stockings every month for a year. For over 4,000 points this is increased to two pairs



There was not the usual slump after the end of the contest. As the delivery of shoes, hats, socks, ties and jackets took place, and while materials were being chosen and suits fitted, morale remained at a peak



suits were so close that this event was abandoned. (There was a difference of only one point between the two leading districts, and only 1,000 between first and last.) Instead, as a gesture of appreciation, the management decided to present every salesman in every district with a silk tie. This example, incidentally, shows not only how the benefits of such a competition are spread rather more evenly over a sales force, but also emphasizes that the organizers must keep wide awake while a contest is in progress, in order to make running adjustments to the original plan as the need arises.

During the period of the contest, interest in it was kept alive by a series of "Whispering Men" news bulletins, which gave latest scores and results in the form of a confidential tip passed from one whispering man to another. Rather more formal progress reports were also contained in the regular news circulars sent out by the sales manager.

The cost of the contest was in the region of £500. This is more than was expended on previous competitions, where orthodox prizes were at stake. But the firm consider that concrete sales results alone justify the extra expense. In the six weeks in question, sales showed an increase of 18 per cent over any comparable period in previous years. This, in view of the volume of business handled by Maintenance Division, is highly satisfactory.

The figure is, of course, influenced by the launching of the new product we mentioned. But even if that is completely discounted (which is not entirely fair, since other years also saw new products launched) sales are still up 10 per cent and more on

previous contests. Quite apart from that, the new detergent itself did exceptionally well. It is some measure of the incentive-value of Johnson's scheme that its launching did not cause the number of calls made by representatives to drop, although this would have been normal. In actual fact, the number increased slightly.

Equally important, from the contest point of view, was the fact that this year there was not the usual slump in sales after the period of the contest had expired. The extraordinarily high level that had been achieved did, of course, fall off to some extent, but not nearly so much as in past years. This again is an indication that the theory of spreading the butter over a greater area is on the right lines.

Some credit is also due to the actual nature of the prizes offered. For the weeks after the end of the contest, instead of being an anticlimax, saw the delivery of socks, ties, shoes, hats and jackets, while the top men had sessions at their

nearest Austin Reed shop, choosing materials and being fitted. For the very few, the after-effect lasted even longer, as each month brought one or two pairs of nylons with it.

What modifications would the sales manager make if he ran the contest again? "On the whole, very few," he says. "Perhaps the points value of the suits might be raised slightly, and the list of other garments extended accordingly. For one must constantly preserve the balance of incentives, so that it is possible to reward the average man without discouraging above-average men from trying really hard.

"Apart from that, an aspect that deserves further development is the role played by salesmen's wives in the promotion. Our idea of a regular supply of nylons as a prize should be considered more closely, and we may adapt and extend it in other ways in the future.

"But as regards the general outline of our scheme this year, I think it can stand. Not only was it one of our most successful contests from the firm's point of view; it was also one of the most popular ones ever held as far as the sales force is concerned."

2The Arden Farms Co. of Los Angeles, U.S.A., is a large dairy concern which not only supplies milk on a house-to-house basis, but also markets dairy produce such as butter, eggs, cheese and margarine through regular retail outlets. A sales pro-



The firm sent the 'cold cash' earned by a salesman directly to his wife, who was told she had become the 'Checker of the Exchequer.' This turned out to be a universally popular move—among the wives

The contest closed with a giant auction of goods such as refrigerators, television sets, deep freezers and household appliances. A professional auctioneer was in charge—but only 'cold cash' dollars were usable for making bids

motion which it ran last year was notable for the fact that it employed a most unconventional method which catered for wholesale and retail salesmen simultaneously.*

Goya Sabam! was the slogan. It meant: Get Off Your Arse . . . Sell Arden . . . Be a Millionaire! Nor was this last exhortation altogether an exaggeration. For the sales scheme envisaged the possibility of top salesmen earning a million dollars . . . only they were to be specially - printed phoney dollars known as "Arden Cold Cash" or A.C.C.

This was the scheme: every product sold or made by the firm was given two points values, the one for wholesale and the other for retail salesmen. Thus, while wholesale men received only five dollars a unit on cheese, retail men were rated 40 dollars a pound. This differential system ensured that both sides of the sales force were able to compete on an equal basis.

The A.C.C. bonus, which was paid in addition to normal commission, was to be collected week by week, and then brought along on a fixed day after the close of the contest to a meeting hall in Los Angeles. There it would be used as the only accepted currency in a large-scale auction. The goods on auction would include some 7,000 dollars' worth of nationally branded goods such as deep freezers, TV sets, household appliances and children's toys.

Now comes a somewhat diabolical aspect of the scheme: all the "cold cash" earned by salesmen was sent by the firm, where appropriate, directly to the salesman's wife. She was kept fully informed of what was happening, and was told she had become "Checker of the Exchequer." This turned out to be a universally popular move—among wives.

Thus, while sales meetings and circulars spread the news among Arden employees that the competition was on, its real impetus came from behind the front line . . . from the wives who had been told in a promotional letter:



Check List for Incentives

1. Plan the contest so that everyone can win something.
2. Ensure that above-average results will get above-average rewards.
3. Enlist the help of salesmen's wives. Let them add greater impetus to your competition.
4. Use your contest for specific objectives. Give salesmen something special to push.
5. Keep competitors informed during the contest about the way it is going.
6. Don't just run your contest—sell it to your staff before you start.

"The whole programme is designed so that you have an equal chance to win. Of course, that chance depends entirely on how much 'A.C.C.' you receive each week from your husband's sale of cheese, margarine, eggs and evaporated milk.

"Encourage him . . . every day . . . with the battle-cry . . . Goya Sabam."

And that was only the first letter of a barrage lasting for nine weeks. With the phoney dollars every week came another one, personally addressed, telling the wife of the progress of the competition. Wives were also asked to write in saying what goods they would like to see up for auction at the end of the contest. Every effort was made to act on these requests.

The company were rather taken aback at the success of their idea. Sales jumped up so rapidly that the initial print order of 60 million "dollars" turned out to be inadequate. More had to be produced.

During the promotion, top men earned up to several hundred thousand dollars, and the production department had difficulty keeping up with the orders that flowed in.

When the appointed day for the auction came, no fewer than 1,200 people turned up for the fun. A professional auctioneer had been engaged to run the proceedings, and presided over a veritable treasury of goods. Bidding was keenly competitive, and ranged from a few thousand dollars to as much as a quarter of a million, depending on how much an item was in demand, and how much A.C.C. was still in circulation.

For, of course, that was where the idea proved so attractive. The big money, earned by the top men, could buy big things, but could only do so once; so that even after the giants had had their pick, there remained substantial crumbs for the others to fight over.

As regards practical achievement the sales department reported great success. During the contest sales rocketed on all sides—in some cases by as much as 500 per cent. Men on the milk round took more time at each back door to sell subsidiary products, and wholesale men spent longer contacting new customers (for whom there was a special bonus). Thus, in addition to actual increases in sales, many new outlets were opened, and existing accounts were, in many cases, induced to extend their Arden range.

The whole promotion was, of course, expensive. But as nearly as can be calculated, its entire cost, including all the prizes, was less than two per cent of sales during the nine weeks. This the company consider to be normal for campaigns of this type, and especially satisfactory in view of the overall results achieved.

The company are also delighted with a subsidiary effect of their scheme: Arden Farms Co.—for the majority of employees' wives—is no longer just a place where their husbands work. The promotion has created an atmosphere of harmony and goodwill whose effects will be felt for some time to come.

* First reported in the American magazine *Sales Management*, March 15, 1956.

MEN OF VISION

He Brought New Colour to Industry

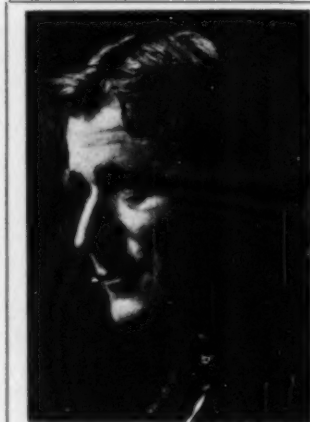
SOME 30 years ago, at an exhibition of the Royal Photographic Society in London, some outstanding colour photographs aroused professional interest. It turned out that they had been submitted by a 17-year-old boy—Adolf Morath.

In the years that followed, his name became well-known both here and abroad. The boy who had started his career with a box 'Brownie' and who was self-taught, became successively press photographer, freelance, author and portrait photographer. Then he turned to photographing industry.

Morath was one of the first to realize the latent beauty in industrial subjects, and industry was quick to use his pictures for publicity and exhibitions, brochures, annual reports and advertisements.

But he was not content merely to make a good living out of his craft—he wanted to explore new fields and use new techniques—among them colour photography. His professional work was nearly all black and white, for he had experimented with the various colour processes available, but was dissatisfied with the results. Colour prints were ruinously expensive and unreliable in tone values, while transparencies lacked the element of texture which a good photographic paper can contribute.

Then, shortly after the last war, a revolutionary new colour process was put on the market. Instead of



ADOLF MORATH
... has stolen a march on the competition

producing a colour positive, or transparency, it gave, in the first place, a colour 'negative,' on which actual colours appear to be reversed. Thus, a blue sky might appear in its complementary colour, yellow, grass reddish, etc. What this meant was that the colour reproduction was in the form of prints, on papers similar to those used in black and white photography. Also, almost unlimited enlargements were made possible.

Morath immediately started to investigate the new method. At first, results were disappointing. Colour

reproduction was not up to the standard he demanded. But he then looked more closely into the actual development and printing processes, and found that far more than purely mechanical reproduction was involved. Colour matching and use of filters, for instance, were factors demanding a high degree of skill and taste in the operator.

He decided to take a risk. At his own expense he fixed up a complete processing laboratory for colour work in London, and hired technical staff, importing them from abroad where necessary. As his experiments continued, he began to get better and better results. At last he was satisfied. The new technique, he felt, had been mastered, together with its many attendant problems of lighting and film speeds.

His first commissioned colour work in the new process was done just over three years ago. Today he concentrates on it to the exclusion of all else, and he is the only photographer in the country with the facilities for this class of work.

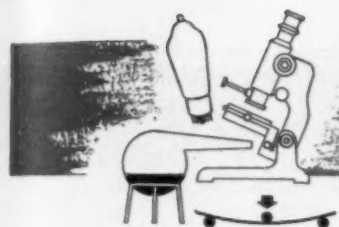
Morath's processing laboratory enables him to produce colour enlargements of up to 15 by 20 feet. Mounted on wood, these fine-grain pictures are ideal for exhibitions and prestige window displays. As such, they are being used to tell other countries of the achievements of British industry.

New Meaning

One of his recent assignments, for instance, took him all over the British Isles on behalf of the British Iron and Steel Federation. His task was to photograph the steel industry—the sort of broad assignment he tackles with particular enthusiasm. For it allows him to give new meaning to the relationship between man and the machine, portraying the job that is done in terms of the people that do it. The resulting pictures form an impressive portfolio.

But they are also evidence of the business acumen of this craftsman who has stolen a march on the competition, and is exploiting a new field single-handed.

BUSINESS

**SCIENCE****PROSPECT**

PLAIN MAN'S GUIDE TO NEW TOOLS AND TECHNIQUES

How Pressure Welding Aids Repetition Work

By ALAN PETERS

The development of new welding methods has simplified the fabrication of many products. Last month's "Science Prospect" described up-to-date uses of the argon-shielded arc and other fusion welding processes. Here is a complementary article showing how the pressure processes—especially resistance spot-welding and flash butt welding—are enabling manufacturers to cut costs and get better results on mass-production work.

ELECTRICAL resistance welding is simply an up-to-date version of the blacksmith's fire-and-hammer joining process. The "fire" is the heat generated by the passage of a low-voltage high-amperage electric current through a controlled section of the work. The "hammer" is the localized pressure applied by the electrodes of the welding machine—one on each side of the work.

For some years after its introduction, resistance welding was generally neglected. Because it had broken away from the accepted principle of *visibly* melting the edges of the work with the intense heat of a gas flame or an electric arc, designers and production engineers were not easily convinced that the new process was capable of making consistently good welds.

Now its value is recognized by firms of all types and sizes. The last barriers are being broken down in the aircraft industry—where unreliable welding is liable to have more serious consequences than spoilt work or cancelled orders. The Handley Page *Victor* and *Herald* are among the resistance-welded planes which are coming off the production lines in Britain.

One advantage of resistance spot-welding airframe structures is that the elimination of thousands of rivets saves a considerable amount of weight. Another is that it produces completely smooth surfaces. The American aircraft industry embarked on this method of fabrication during the 1939-45 war and now accepts it unquestioningly.

Automatic Spot-welding. Spot-welding is in fact the most common resistance process. By using small-diameter contact electrodes with shaped tips, the heat and pressure are concentrated at selected spots, enabling the components to be "tacked" together with small fusion-welds. Variations include stitch-welding, where a line of spot-welds is built up in sewing-machine fashion; and seam-welding, where the materials pass continuously between a pair of roller electrodes.

Resistance welding equipment is capable of playing an important role in the fabrication of mass-produced articles, either as a unit of the main production line or as an independent unit turning out large numbers of identical sub-assemblies. For here, indeed, is one of the process's most attractive features—the fact that consistently strong, neat joins can be made at high speeds by unskilled operators. Moreover, the prospects of full automation, where the work is loaded and ejected automatically, are much better than in the case of any other welding process.

The experience of one of the leading manufacturers of resistance welding equipment illustrates an important trend. While this firm still make large numbers of standard machines, they find that the demand for custom-built automatically-controlled equipment is increasing rapidly.

Some machines of this type are capable of making 200 welds simultaneously. Pre-set controls enable welds of consistent quality to be repeated indefinitely, provided the electrodes are replaced at intervals determined by the nature of the work.

Using resistance welding equipment, consistently strong, neat joints can be made at high speeds by unskilled operators. Moreover, the prospects of full automation, where the work is loaded and ejected automatically, are much better than in the case of any other welding process

Here is an example. Welding the floor body of a commercial vehicle on to the chassis involves more than 500 spot-welds. Two machines, known as "permutation" welders, are used. In each of them, a movable beam (housing transformers, cylinders, electrodes and other welding equipment) traverses the work, stopping at a number of "stations" while the appropriate welds are made. One machine welds the floor to the cross-members of the chassis (310 spot-welds); the other welds it to the longitudinal members (204 spot-welds). The floors are loaded and ejected mechanically.

In these machines, the disposition and number of welds made at each station can be pre-set in any numerical combination. The permutation principle can be applied to a wide range of components.

Another special-purpose machine produces car wheels by spot-welding the outer rims to the inner cores or "spiders." This example shows how automatic welding is sometimes dovetailed with other assembly processes.

The installation has an output of 770 wheels an hour, and involves seven operational stages. A rim and a spider are fed into the machine at

one end, piloted mechanically through successive stages, and ejected at the other end as a complete wheel. This is the sequence:

Stage 1—The rim is automatically unloaded, hot-washed and dried.

Stage 2—The spider is pressed on to the rim.

Stage 3—The assembly is turned over in readiness for the welding processes.

Stage 4—Four "guns" at right angles to one another make four simultaneous spot-welds.

Stage 5—Another battery of "guns" makes the four intermediate spot-welds.

Stage 6—A piercing press forms the valve-hole.

Stage 7—A coining press prepares the rim for the decorative wheel cover.

Joseph Sankey Ltd., Bilston, Staffs., have installed a number of automatic spot-welding machines which enable prefabricated house panels measuring 9ft. by 4ft. to be produced continuously on a conveyer travelling at the rate of 9ft. a minute.

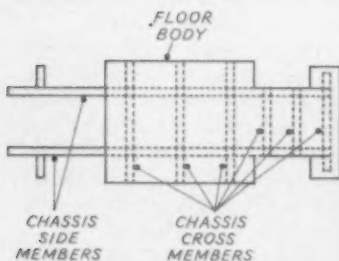
Welding takes place while the machine is traversing the conveyer at the same speed. As soon as a weld is complete, the machine automatically returns to its original location in preparation for the next weld. By

calculating the speed of the conveyer in conjunction with the time taken to weld material of 2 x 14 s.w.g. thickness, the speed and weld-time have been synchronized to produce spot-welds at intervals of 3in.

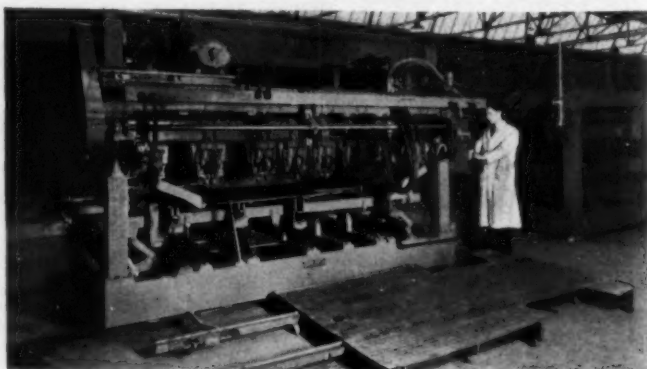
Using these machines, a small number of unskilled operators can turn out approximately 60 panels an hour. The only manual operations are loading the components at one end of the line and removing the panels at the other. This installation is the result of co-operation between Joseph Sankey, who made the conveyers, jigs, etc., and an electrical engineering firm, who supplied both standard and specially-designed welding equipment.

In another application, a multi-head machine produces car bucket seats—each containing 110 spot-welds—at the rate of 90 an hour. There are three operators. To achieve the same output with conventional spot-welding equipment would require at least 14.

The experience of firms in several industries has proved that multi-head machines can make big economies under suitable conditions, especially where sheet-metal pressings are being produced in long runs. Manufacturers of perambulators and refrigerators are among the users of such equipment. But although "specials" and "automatics" are now ousting the simpler types of resistance welding equipment from some branches of production, this trend is by no means universal. In many cases, the flexibility of the portable spot-welding gun (which also has developed considerably in the last few years)



One of two Sciaky permutation spot-welders used in the production of car floor bodies of the type shown in the sketch. Automatic controls enable the same welding "pattern" to be repeated as many times as are required.





SCIENCE PROSPECT

ing either mechanical or electromagnetic principles are being superseded—as in other branches of engineering—by the magic word “electronics.”

The latest type of electronic equipment enables even the most complex welding cycles to be placed under fully automatic control. Once the settings have been adjusted by an experienced welding engineer, the whole process can be carried out by relatively unskilled operators. If it is necessary to change the welding cycle, the controls can be re-set in a matter of minutes. Even old or simple resistance welding machines can be brought up-to-date in this way.

Projection Welding. Where high output speeds are essential, projection welding offers some advantages. In this extension of the resistance spot-welding process, “bumps” of a specific size and shape are raised on one of the parts which have to be joined. When the parts are held together between the platens of the welding machine, the “bumps” locate the positions in which spot-welds will be made, since the current (and therefore the heat) is concentrated at these points.

Timing is less critical than in the case of ordinary spot-welding, since welding stops as soon as the projections collapse and the sheets make contact over the whole area covered by the platens of the welding machine. On the other hand, it is more difficult to make welds of uniform strength, since there is no way of ensuring that individual projections collapse at precisely the same moment.

Main advantages of projection

This automatic multi-point spot-welding machine built by Philips Electrical Ltd. fabricates car bucket seats from nine different pressings. With three operators, it has an output of one complete seat every 40 seconds.

offsets the advantages which might be gained from mechanization.

Both types of equipment have their place in the mass-production factory. This pattern is seen in the motor industry, where the hand-held gun is a standard tool on the main assembly line, although specials and automatics are being used increasingly in the fabrication of the larger sub-assemblies.

One disadvantage of the standard single-head spot-welder is that it is sometimes difficult (or impossible) to place the electrodes on both sides of the proposed welding position. Some American aircraft manufacturers have developed spot-welders with throat depths of up to 30ft., but these are exceptional. A recent introduction is the “poke” welding attachment, developed primarily for use in the aircraft industry. This facilitates the spot-welding of assemblies which are too large or too complicated to be accommodated in a standard machine, and enables dependable welding to be undertaken in positions where

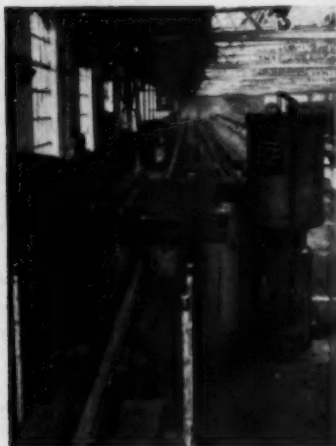
only one side of the work is accessible.

Whatever type of equipment is used, the quality of the welding depends mainly on the accurate control of three conditions: current, time and pressure. Especially in the case of light alloys and high-temperature alloys, these conditions are critical. It must be appreciated that in the assembly of precision components the failure of one spot-weld means a costly stripping operation, or even the scrapping of an expensive component.

For some time, therefore, much attention has been directed at the development of really efficient control systems. Today, systems involv-

The latest types of electronic control equipment enable even the most complex welding cycles to be placed under fully automatic control. Once the settings have been adjusted by an experienced welding engineer, the whole process can be carried out by relatively unskilled operators

Economical in current—and in preparation time—the flash-butt process can handle a variety of work. On the right, flash-butt welding metal window frames. Below, an automatic installation for the fabrication of railway rails in solid continuous lengths. In both cases the equipment was built by Al Electric Welding Machines Ltd.



welding are: (1) it simplifies the task of making several welds simultaneously; and (2) it allows welds of special shapes to be made. Appearance is improved, too. The process is now being used extensively in the manufacture of motor-car fittings. **Cost-cutting Fabrication.** An important member of the resistance welding family is the flash-butt process. Although its applications have grown considerably during the past few years, industry is still a long way from exhausting its potentialities as a cost-cutting method of fabricating both large and small components.

In the original form of resistance butt-welding (which still has many applications) the close-fitting ends of two parts are held together under great pressure while a heavy electric current is passed through them. The weld is made as the faces of the parts deform into each other under the weakening effect of the heat which is thus generated.

In the newer and more versatile flash-butt process the *roughly machined* ends of the parts are pressed *lightly* together. The high electrical resistance of the contact generates intense heat as the current is passed



through the work. Oxidized metal and impurities are thrown out of the joint while the parts are being heated. But although the ends are thus steadily "burnt away," compensation is provided by the movable jaws of the welding machine, which continuously press the parts together and maintain the electrical circuit. As soon as the right condition is reached, the weld is made by pushing one end into the other with a "bang."

The fireworks display associated with this process leads many people (not only laymen) to believe that flash-butt welds are made by striking an electric arc between the two parts. In fact, there is no arcing at all. A big advantage of the "burning away" process is that, within reasonable limits, the edges of the proposed joint do not require careful fitting. A disadvantage is that the final length of the assembly is less than the original length. Allowance for this "shrinking" (the extent of which is governed largely by the time-cycle of the machine concerned) has to be made when the parts are produced.

Flash-butt welding can be used successfully with very many metals and alloys. In the case of steels—assuming that proper heat treat-

ment is given after welding—the tensile strength of the assembly is virtually as great as that of the component parts, and even the fatigue strength may be as high as 90 per cent. Post heat-treatment does in fact restore the material to its original state, except for a few microscopic impurities in the region of the weld. With non-ferrous metals the results are not as good, although they are entirely adequate for many purposes.

Apart from the fact that edge-preparation is simplified, flash-butt welding has several advantages over the original butt welding process. Probably the biggest advantage is that considerably less current is needed to reduce the edges of the work to a plastic condition. There is also less distortion of the metal in the vicinity of the weld.

Some of its most profitable applications concern the fabrication of parts which would otherwise have to be cast (or forged) and machined in one piece.

For example, a lever arm can be produced by flash-butt welding a length of tube between two drop-forged ends. A fabrication of this sort is generally cheaper, lighter and stronger than a similar all-in-one-piece component.

This principle is used extensively in the construction of railway carriages and wagons. Parts which were formerly made as complicated one-piece forgings have been resolved into sub-components, many of which can be produced quite simply from drop-stamps, standard bar sections or oxy-gas profiled units and then flash-butt welded into complete assemblies. Savings are made principally by reducing (1) die costs (2) heating charges, and (3) labour costs.

The flash-butt process is particularly suitable for mechanization and mass-production. In modern

Specials and automatics are now ousting the simpler types of spot-welding equipment from some branches of production. But in many cases the flexibility of the portable spot-welding gun offsets the advantages which might be gained from mechanization

installations the whole welding operation—including heat-treatment before and after welding—may be incorporated in a completely automatic cycle, pre-set for specific jobs. Attended by unskilled operators, such machines achieve remarkably high rates of production.

The process is being used in the fabrication of railway rail in solid continuous lengths of 1,000ft. or more. At the other end of the scale, automatic flash-butt welding machines are handling a variety of smaller articles, including metal window frames, electric motor components, fire extinguishers and milk churns. The process is also used by cutting tool manufacturers as a method of joining medium- or low-carbon steel shanks to the all-important high-speed steel cutting portions of the tools—further evidence of its ability to provide practically one-piece strength.

Joining Without Heat. The "pressure" welding group is composed mainly of the resistance processes. One exception is cold or solid-phase welding. On the face of it, this seems to offer more exciting prospects than any other "new" method of metal fabrication. But at present there are few signs of these prospects being realized on a commercial scale.

Intense heat is not used. The parts are simply welded into one by the pressure of the welding machine's closing jaws. A lightweight example—and one of the few commercial applications so far—is sealing the ends of collapsible tubes for toothpaste and other commodities.

During the 1939-45 war, a German aircraft company produced heat exchange units by this process. Each unit was fabricated from two flat plates, brought together under tremendous pressure, while suitably-machined dies formed a labyrinth of tubes inside the unit. About 100ft. welds were made in one 90-second pressing operation.

To produce these units, the German company set up a special factory. And there, indeed, is the snag: the cost of developing and installing special-purpose plant for solid-phase welding is extremely high. But the

fact that it is a purely mechanical process which could easily be incorporated in an automatic production line suggests that more will be heard of it in the future. On repetition work, where the high capital cost is justified by the nature of the components in question, it is undoubtedly capable of making big savings.

The process can be applied to most ductile weldable materials.

Checking the Results. Inspection and testing methods have made almost as much progress as the welding processes. To the comparatively old-established methods of radiography and magnetic flaw detection (both of which have been streamlined during the past few years) has been added a new technique: ultrasonic inspection. Together, these methods satisfy the requirements of virtually all classes of work.

The ultrasonic testing of welds has only recently emerged from the experimental stage, and some teething troubles are still encountered. But there is evidence that it will eventually become a valuable workshop tool. At present, its application is mainly

restricted to the inspection of big welds—in boiler seams, for example.

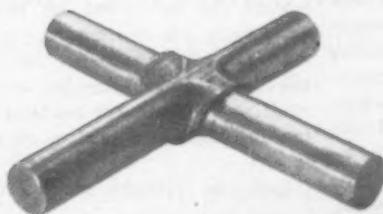
Much emphasis is being placed on the development of lightweight, portable inspection sets. With such equipment it is possible to test welded fabrications on the shop floor, thus saving the expense and trouble of transporting them to a central inspection department. Especially in the case of heavy fabrications, the advantages are obvious.

More Progress Ahead. This article and its predecessor do not provide a complete catalogue of the progress which has been made in welding during the past decade. Their purpose has been simply to indicate the more important current and future developments.

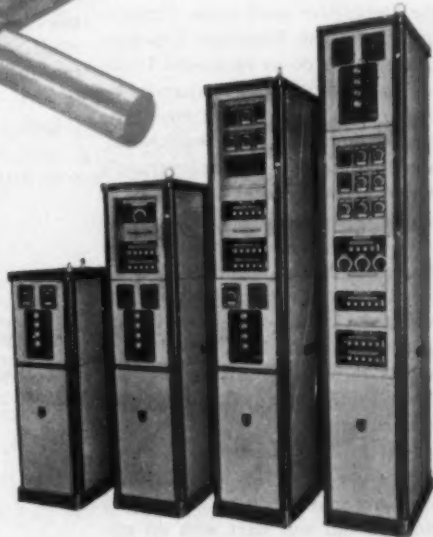
Now welding is firmly established as a modern assembly process, its applications will increase rapidly. Some competition may be encountered from the other joining methods—for example, the use of adhesives for joining metals shows remarkable promise—but the present rate of expansion is unlikely to be checked for many years to come.



SCIENCE PROSPECT



This range of electronic units enables all types of welding equipment to be controlled automatically. Above is one of the many difficult operations—the consolidation by resistance welding of two 1/2 in. diameter steel rods—which have been made possible by the introduction of electronic control. Under constant pressure the rods flow perfectly into each other as each pulse maintains the material in the correct plastic state.



MANAGEMENT AT WORK

BREAKING NEW GROUND

IN danger of becoming unfashionable—if many firms follow the example of the American Automatic Electric Company—is the use of dainty silver spades at the sod-turning ceremonies which so often precede the construction of factories and factory extensions.

When Automatic Electric took the first bite out of the site of a new 1,300,000 square-foot headquarters building just outside Chicago, their president, Leslie H. Warner, and the president of the parent company, Donald G. Power, apparently decided that a hand shovel was hardly impressive enough to suit the occasion. So they took turns at working the controls of a giant earth-moving machine.

ENTER IDA

HONEYWELL-BROWN Ltd., Greenford, Middlesex, manufacturers of industrial instruments and automatic controls, have redesigned their staff training policy. A new programme was launched recently with a three-day conference bearing the impressive (and even frightening) title "The Integrated Development Approach to Personnel Training"—I.D.A. for short. Attended by branch and departmental managers, it was conducted by Howard Mold, director of training for the company's American associates.

Aim of the full I.D.A. programme is to develop the personal resources of employees by regularly holding seminars in branch offices and departments. Current problems will be studied—and future problems anticipated—through group discussion and role playing under the leadership of local managers.

For the branch offices a detailed programme of weekly seminars has been prepared. Each will last for 90 minutes and will start with an ap-

praisal of the practical application during the preceding week of the techniques evolved at the previous seminar. All aspects of the relationship between the company and their customers will be covered.

WAR ON DUST

DUST and fumes are the enemies of every manufacturing process. To a firm who are producing such delicate items as miniature and sub-miniature valves, their attacks can be disastrous.

For this reason Hivac Ltd.'s new factory at South Ruislip, Middlesex has been built in a form which enables all electrical, gas, water and other essential supplies to be piped into the main assembly section from a specially-constructed basement. Even the vacuum pumping machines have been placed underground, thus eliminating oil fumes and dust-harboured pipes and wires from the assembly shop.

Another advantage of this set-up—said to be unique—is that maintenance can be carried out much more easily. It also ensures maximum freedom from noise, and enables the most efficient use to be made of the floor-area available in the air-conditioned portion of the factory.

Girls on assembly work wear

Cleanliness is a watchword at Hivac Ltd's new factory. All electrical, gas, water and other essential supplies are piped into the assembly shop from the basement (see this page.)

nylon headscarves and overalls, which do not shed fibres. To make sure that there is no trouble from nose-powdering, all handbags have to be placed in individual lockers before the work begins.

Highly-polished wood-block floors are another weapon in the war on dust. To dispense with dirt-collecting stanchions and roof girders, a barrel-vault type of construction has been adopted.

Some types of work requiring even more stringent standards of cleanliness are performed in an "inner sanctum" where the girls wear distinctive overalls. This project has been christened "Operation New Pin."

CLEANING COSTS CUT

MAINSPRING of personnel management is applied psychology—whether or not you like that label. The Nationwide Insurance Corporation of Columbus, Ohio, U.S.A. decided that they were spending too much money on keeping their offices spick and span. So they launched a five-year cost-cutting campaign which was concerned primarily with raising the status and the morale of their office cleaners.

Believing that the name "janitor" had acquired a certain stigma, the company began to call them "sanitors." Smart uniforms were provided so that sanitors could travel to and from work as respectably dressed as any other group of employees.

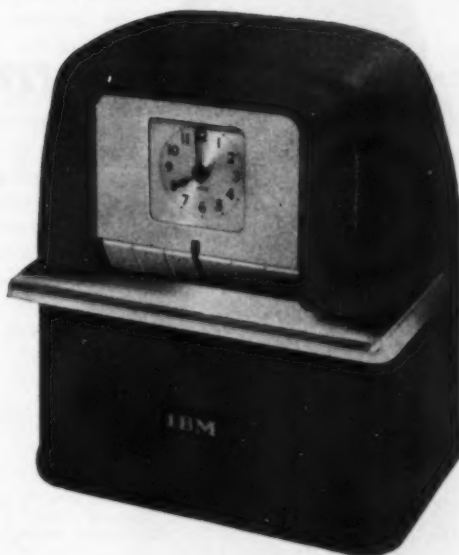
Moreover, individual sanitors were no longer assigned to gangs which moved from floor to floor. Each



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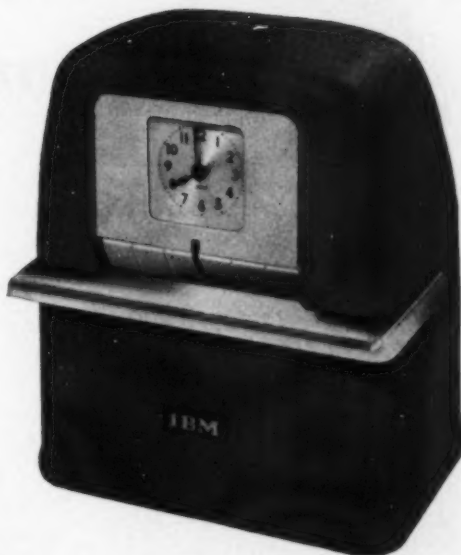
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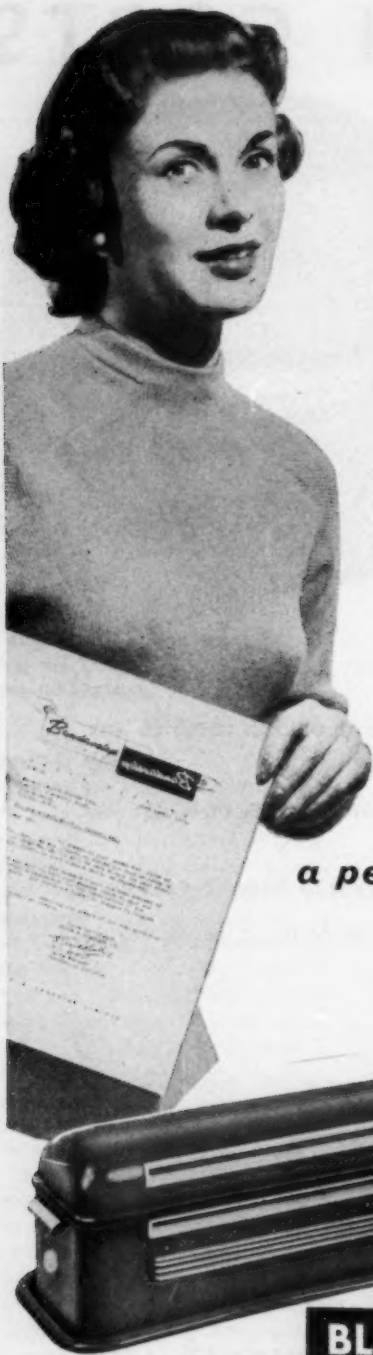
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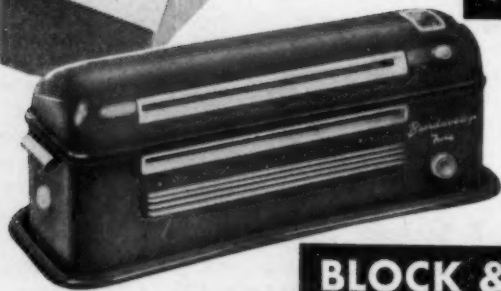
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was made responsible for the cleanliness of a specific area. "Merit" awards, salary increases and promotion opportunities were introduced as a reward for good work.

Alongside the upgrading of employees, the company carried out research into "scientific" cleaning methods. Even such simple operations as polishing desk-tops were studied with a view to eliminating unnecessary movements.

The pay-off? Before the new system was introduced, one *janitor* cleaned, on the average, 6,000 square feet a day. Now one *sanitor* handles 13,000 square-feet—without working any harder.

Despite the effects of inflation, higher salaries and the introduction of fringe benefits to bring cleaners into line with other employees, office cleaning costs have been reduced by approximately one-third.

IN THE PICTURE

EVEN back-row delegates got a view of the exhibits at a scientific conference which Imperial Chemical Industries held recently at their Fernhurst plant protection research station. For the company had set up a closed-circuit television system—probably the most elaborate ever to be used during a demonstration of this kind.

Films and slides illustrating the lectures were projected straight into a TV camera in a mobile studio parked near the conference marquee. From there, the pictures were relayed on to 60 domestic-type receivers inside the marquee. These were ar-

ranged so that none of the 200 delegates—who came from 42 countries—was more than four feet from a set.

The TV system was also intended as a precautionary measure. Had bad weather made it impossible for the delegates to assemble in the open for the machinery demonstration, this would have been televised.

Favourable comments were made on the clarity of the image on the screens and on the ease with which the films and slides were viewed. On the last day one of the sets was used to give some of the visitors their first sight of a Test match—which seemed to puzzle them more than the intri-

cate scientific diagrams which they had been studying during the conference!

JOB'S FOR LIFE

LONG service is the rule rather than the exception at the Purfleet, Essex, factory of Van den Berghs and Jurgens Ltd., manufacturers of Stork margarine. No fewer than 421 of the factory's 1,000-odd employees have at least 15 years' senior service (service after reaching the age of 21) with the company. This figure includes 307 with more than 20 years' service; 264 with more than 25 years; and 130 with more than 35 years.

Book Reviews in Brief

INDUSTRIAL RESEARCH—Advisory Editor, Dr. Percy Dunsheath—(Todd Publishing Group) 63s. Starting with general articles on income tax in relation to research and careers in research, this directory goes on to list and give details of Government and public research bodies, research associations, professional and learned societies concerned with research, and universities, private firms and consultants. Periodicals and books on research are listed, and also the scientific correspondents of the national press.

COMPANY ANNUAL REPORTS by R. J. Chambers (Sweet and Maxwell) 55s. This book is in two parts, the first on function and the second on design. In the first, the interests of the general public, investors, creditors, workers and others are discussed. In the second, numerous British and American illustrations are given of ways to depict effectively the items included in a company's report and accounts. This is a most valuable and comprehensive book for the company

secretary whose chairman wants to "modernize" the accounts and asks for suggestions.

ELECTRONIC DATA PROCESSING FOR BUSINESS AND INDUSTRY by R. G. Canning (Chapman and Hall) 56s. Describes the characteristics of electronic equipment available in the United States and also the principles and methods used in programming a flow of former clerical work so that it can be processed through electronic equipment.

ADMINISTERING A CONVERSION TO ELECTRONIC ACCOUNTING by H. F. Craig (Bailey Bros. and Swinfen) 20s. Describes the committee work, etc., which went on in a large American insurance company before conversion.

OCEAN CARRIAGE by E. F. Stevens (Pitman) 12s. 6d. A stage-by-stage account of the problems involved in shipping goods abroad, from the receiving of an order, through packing and other physical problems, and the paperwork of bills of lading, etc., to final unloading at the port of destination.

SMALL BUSINESS IN BRASS FABRICATING by Theodore F. Marburg (New York University Press) 5s. A most interesting account of the growth of a small American business, founded in 1865, and of its subsequent decline and extinction in 1936.

NEW DEVELOPMENTS IN INDUSTRIAL LEADERSHIP (The Polytechnic, Regent St., W.1) 5s. Four essays comparing management developments in Britain, the United States, Germany and France.

BUSINESS FORECASTING (P.F.P., 16 Queen Anne's Gate, S.W.1) 2s. 6d. A short pamphlet surveying the different methods of forecasting.

THE OFFICE WORKER (H.M. Stationery Office) 1s. One of the "Choice of Careers" pamphlets.



Films and slides were shown on a closed-circuit TV system at I.C.I.'s recent plant protection conference. No delegate was more than 4ft. from a set (see this page).



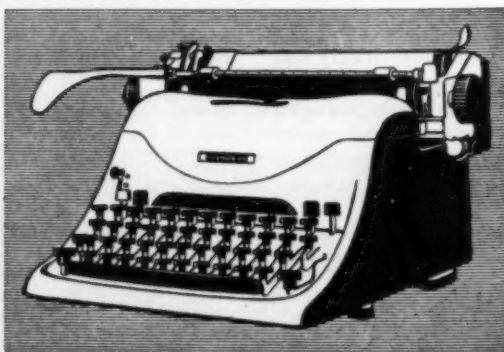
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The Businessman's Q and A on OPERATIONAL RESEARCH

By V. C. HARE and R. VASWANI

Linear programming is one of the mathematical techniques of operational research. Many business situations require the allocation or assignment of scarce resources to a series of competing and interrelated demands.

Linear programming tackles such problems mathematically.

It has been widely adopted in the United States, and is also being used by some British firms. The questions and answers to follow, provide a quick view of what this method can and cannot do. This article was originally prepared by Operations Research Institute, Inc., and later appeared in 'Management Methods'

QUESTION: What problems can Linear Programming handle?

ANSWER: Suppose you operate a shop with four screw machines, and you have six products (with different profit margins and machine times) that you must produce in given quantities. One of your machines is quite old and has a slow cycle. Two are middle-aged, and the other one is brand new and very fast. Since machine-time is limited, how do you schedule your parts on machines in

order to obtain the greatest total profit?

Or, suppose you operate ten factories producing various products, and twenty warehouses (with different freight rates between each plant and each warehouse), and you must ship a given mix of products to each warehouse. From what plants to which warehouses do you ship and in what quantities for minimum total transportation cost?

In these kinds of problems, Linear Programming can help. Note that in

both cases discussed above certain scarce resources, that is, time or money, have to be allocated or budgeted for maximum profit or minimum cost.

Here are more sample questions Linear Programming can help answer:

How to blend aviation gasoline to maintain octane rating, even when ingredients are scarce? How to blend cattle or chicken feeds, or design feeding programmes for livestock? How to schedule the military oil tanker fleet around the world? Where to produce or where to store given products for best profit or lowest cost? How to set sales volume and price for maximum profit? How to assign personnel to jobs?

QUESTION: Why was Linear Programming developed?

ANSWER: Because resources in World War II were scarce. Freight cars, ships, plant capacity, and critical items such as aircraft gasoline had to be used at utmost efficiency. This need spurred on mathematical experts to perfect scheduling and distribution theories. The practical outcome was Linear Programming.

QUESTION: What are its advantages?

ANSWER: (a) It leads to higher profit, lower cost, and a method of operating when resources are scarce. (b) It saves planning time. By reducing complicated assignment or scheduling problems to a simple routine which anyone with a knowledge of high school algebra can handle, Linear Programming frees the time of experienced planning men for other executive work.

Figure 1

	PROBLEM						Available machine hours
	pt 1	pt 2	pt 3	pt 4	pt 5	pt 6	
Mach 1							80
Mach 2							30
Mach 3							160
Parts req.	10	40	60	20	20	30	270

Figure 2

	Hours per unit					
	pt 1	pt 2	pt 3	pt 4	pt 5	pt 6
Mach 1	3	3	2	5	2	1
Mach 2	4	1	1	2	2	1
Mach 3	2	2	5	1	1	2

Figure 3

	Units						Available mach. hrs.	Scheduled mach. hrs.
	pt 1	pt 2	pt 3	pt 4	pt 5	pt 6		
Mach 1		40	10				80	140
Mach 2			30				30	30
Mach 3	10		20	20	20	30	160	220
Parts req.	10	40	60	20	20	30	270	390

Figure 4

	Units						Available mach. hrs.	Scheduled mach. hrs.
	pt 1	pt 2	pt 3	pt 4	pt 5	pt 6		
Mach 1			30			20	80	80
Mach 2			30				30	30
Mach 3	10	40		20	20	10	160	160
Parts req.	10	40	60	20	20	30	270	270

(c) It makes planning possible where it was not so before. For example, if a planner has ten factories and twenty warehouses and has to plan shipments between each, he may well give up after he has found a single plan which will meet the distribution of goods required. Linear Programming tells him how to make up many such transportation assignments, then pick the one with lowest cost.

(d) It provides absolute certainty of a best answer. Formerly, if a planner made up an assignment of work, transportation resources, or time, he was never certain he had picked the lowest cost programme. Using Linear Programming, he can tell when he has made up the best programme, and rest assured no one can determine a better programme, using the same information.

QUESTION: What cost reductions or profits can be expected?

ANSWER: From ten to thirty per cent in most industrial applications so far. For example, SKF Company has reported savings of ten per cent, or \$100,000 a year, through the use of scheduling techniques developed from Linear Programming. (See *Factory*, January, 1954, pp. 136-137.) Phillips Petroleum Company, which schedules gas shipments from fifty sources to three hundred destinations by Linear Programming, is reported to save \$200,000 a year with the new method. Both operations are large scale and complicated. Obtaining these cost reductions depends largely on the skill with which problems are selected for analysis by Linear Programming.

QUESTION: What is the method of Linear Programming like?

ANSWER: First, you must define an objective to work towards, such as maximum profit, minimum cost, or minimum use of certain scarce commodities.

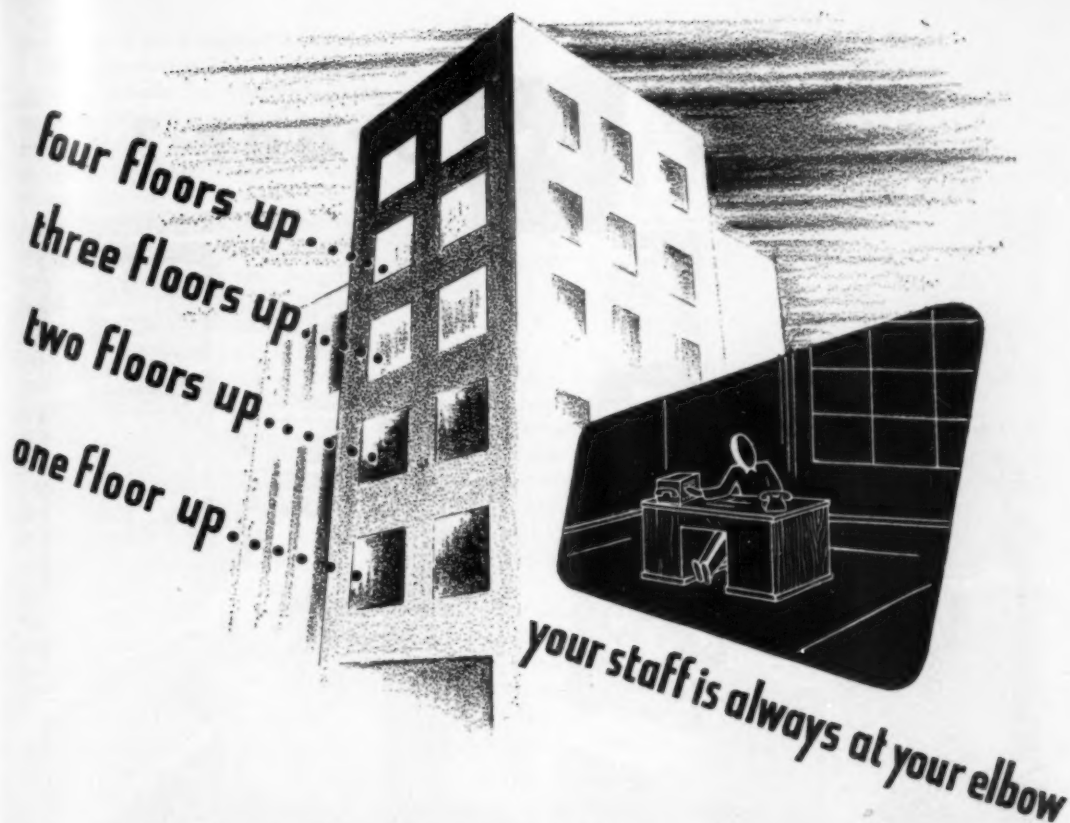
Second, you have to collect information on what resources you have available to allocate and where requirements are located. That is, you must know, in particular, what the inputs and outputs of the operating system (say machine shop) are. You also need to know any operating restrictions. Lists of these resources and needs are made up in a box-like chart (see Figure 1) that mathematicians call a *matrix* or a *tableau*.

Here's a simplified example of one kind of problem that can be handled by Linear Programming. You want to divide orders for six different parts among three different machines in such a way that total machining time will be minimized. The first table shows the quantity of each part to be made in a given period and the number of hours available on each machine for doing this work.

Along with this you need to know the time it takes to process each part on each machine. Characteristics of machines and parts result in differences in processing times. The most efficient machine for making one part is not necessarily the best for another. Figure 2 tells you how many hours it takes to process each part on each machine. The big problem is knowing how to use this information to arrive at the best possible schedule.

You might try to work this out yourself in the space available in Figure 1. Cover up the solutions and see how close you come to the right answer. To find how near you get to the available hours on each machine, simply multiply the units you wish to schedule by the appropriate hours per unit derived from Figure 2.

Figure 3 is an example of one schedule for producing all the parts. It is a trial-and-error solution and requires 390 machine-hours instead of 270. You may have done better. Many schedules could be devised by traditional methods — but usually



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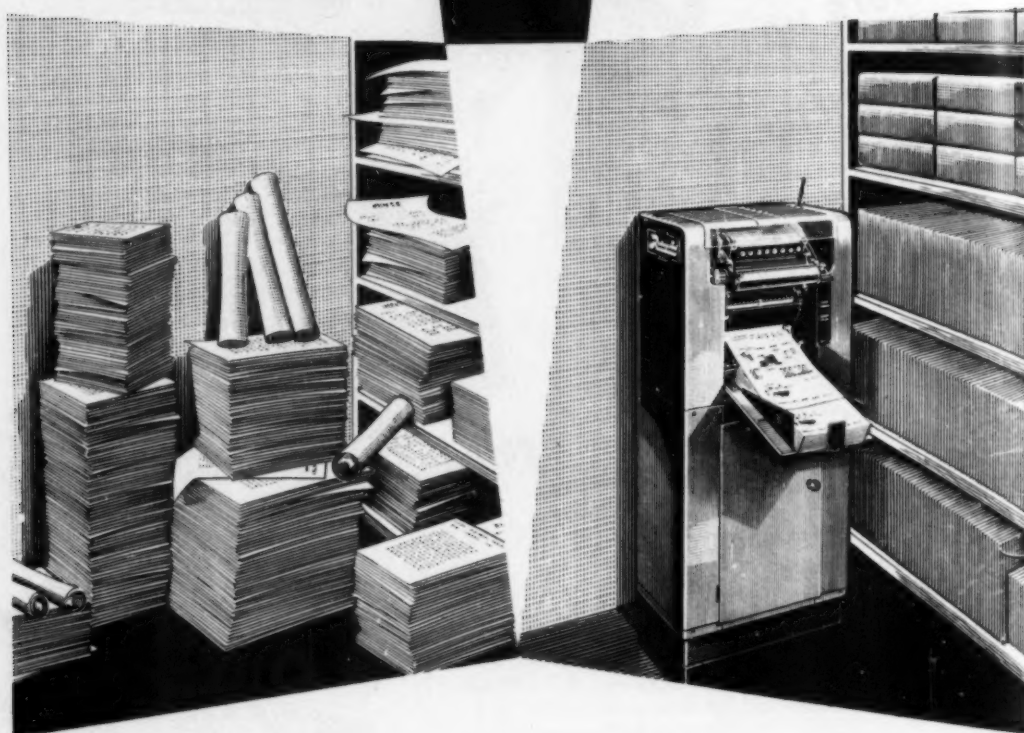
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they'll require extra machine-hours.

The ideal solution appears in Figure 4. It provides for completion of the entire job in the available hours of machining. This schedule was arrived at by Linear Programming. It was obtained by a step-by-step procedure that started with the setting up of the original table. A trial solution was first made according to the prescribed rules of Linear Programming. Then the trial solution was tested with a routine that incorporates the values of hours per unit in Figure 2. The entire procedure requires only the use of simple addition, subtraction, and multiplication.

If you had a problem this simple, you could do very well by trial-and-error scheduling. But you can see that, if the number of machines and the number of orders were increased, the problem would become very complex. That's when you might want to apply Linear Programming to obtain better schedules.

Third, costs of making specific assignments are also collected and inserted in the matrix. For example, if the problem is one of shipping goods from certain origins to certain destinations, the freight rates between these points would be collected and put in the matrix as shown in Figure 1.

Fourth, the question of dividing resources between the various demands comes up. This is a pie-cutting job, with the inherent difficulty that a pie can be cut in a very large number of ways. (This can be seen from looking at Figure 1.) The trick is to eliminate any combination or assignment of resources that is



... pictures a financial situation

costly, impractical, or wasteful.

In simplified terms, Linear Programming starts out with a workable (feasible) assignment matrix. Next, say where the objective is to minimize cost, it tells you how to improve the assignment matrix in a step-by-step manner until you reach the lowest cost assignment.

So, to sum up, Linear Programming is an iterative procedure: a set of computational rules which let you budget more efficiently. Computational details for several problems are shown in Reference (1), page 104.

QUESTION: Can computations be mechanized on an electronic computer?

ANSWER: Yes, they can. Although Linear Programming computations can be done by hand for simple problems, they are best done by machine when the number of resources or demands becomes large.

QUESTION: What basic information is needed?

ANSWER: The following kinds of data—particularly operating restric-

tions—should be available for an industrial process:

- 1—A knowledge of the general manufacturing process and sequence of operations used to produce the products.
- 2—The product line, including all regular and special products.
- 3—A list of customers by product and location.
- 4—The rate of production by product, by department, and by machine.
- 5—Customer demand for a given time period.
- 6—Effective available machine time, including utilization, down time, and the like.
- 7—Comprehensive cost and price information by product operation and machine group.
- 8—Knowledge of the current scheduling practice such as basic approach, methods, procedures, and controls.
- 9—The range, size, and variety of products and parts.
- 10—The number of machine tools, their capacities and abilities.
- 11—Purchasing methods, status of delivery promise, and tooling.
- 12—Other information. For marketing and distribution problems, other information such as freight rates, routing methods, and market characteristics is required.

QUESTION: What is the greatest difficulty in installing Linear Programming?

ANSWER: Collecting the basic data. You spend more time collecting detailed cost and other information than for computation, using the mathematical technique. Often, as much benefit is obtained by gathering



... Operations are large scale and complicated

the facts from which to work as is obtained from the computations. This is because management is forced to focus attention to things which have been neglected under the pressure of time. Moreover, time is spent establishing the relationship of various pieces of information, so a clear picture of what the business is actually doing often results from a Linear Programming study.

QUESTION: Where is the best place to apply this method first?

ANSWER: Pick the most specific "assignment" job you have. This may be allocation of machine-time in the shop, or assignment of shipping destinations to freight cars. Work first with one specific product, then enlarge to others after success with the first.

QUESTION: Where should its use be avoided?

ANSWER: Do not use Linear Programming when costs are non-linear. For example, do not confuse freight rates of carload lots and less than carload lots, since there is a large price break for carload volumes. The problem should be split into two parts in this case, each worked separately. Do not use Linear Programming where conditions change very frequently, or where the cost of items "assigned" is very small. Do not use the method where cost information is inaccurate. See Reference (2), this page.

QUESTION: What groups will do Linear Programming for you?

ANSWER: Most operations research consulting groups, some management consultants.

A good idea is to assign company personnel to work with consulting groups, so your people will be familiar with the method and other possible applications after the consultants leave.

QUESTION: How long does it take to get started?

ANSWER: That depends on how hard the basic data is to get. If you have the required data, you can take it to a university computing laboratory and have problems worked out for a reasonable fee. However, generally, the data is not available in the right form, so it must be collected. Past experience shows two men must work from one to three months to get the data needed. Add six to nine months more if Linear Programming computations are to be made part of company routine.

QUESTION: What is the difference between Linear and Non-Linear Programming and Dynamic Programming?

ANSWER: The basic assumption of Linear Programming is that costs or profits go up or down "evenly" with the level of production or activity. This is the same "straight-line" assumption a break-even chart makes when it pictures a financial situation.

Non-Linear Programming, on the other hand, assumes that this straight-line picture is incorrect: profits and costs vary unevenly as activity changes.

Both Linear and Non-Linear Pro-

gramming show what happens at one instant of time. They are snapshots, not movies. Dynamic Programming, an even more refined mathematical technique, tries to picture what goes on in several periods of time: it looks both backward and into the future. Linear Programming is the only practical method for normal use at this time.

QUESTION: Where will Linear Programming expand?

ANSWER: Most applications now are to transportation and machine assignment problems. Case histories show some companies are pioneering Linear Programming's use in balancing distribution and manufacturing costs, in buy-make decisions, in employment levelling studies, and in sales incentives to take advantage of high profit items in the product mix. Expect more applications in the marketing area in the future.

Expect also mathematical development of practical techniques for Non-Linear and Dynamic Programming so that more complicated situations can be handled faster.

QUESTION: Does Linear Programming replace judgment?

ANSWER: It does not. Linear Programming is not in any sense a cure-all or magic formula. Judgment is required in Linear Programming's application and use. Linear Programming simplifies data collected: it can be as strong or as weak as the judgment used in collecting and interpreting data.

But, if well used, Linear Programming is a valuable asset. It supports management's judgment and sharpens decision-making. So, you'll hear more about Linear Programming in the future.

References: (1) Robert O. Ferguson, "Linear Programming," *American Machinist*, April 11, 1955, pp. 122-127. (McGraw-Hill Publishing Co., 330 W.42nd St., New York 36, N.Y.)

(2) Alexander Henderson and Robert Schlaifer, "Mathematical Programming," *Harvard Business Review*, May-June, 1954, pp. 47-60. (Harvard Business Review, Soldiers Field Road, Cambridge, Massachusetts.)



... it looks both backward and into the future



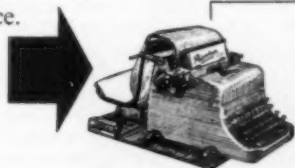
‘Too many cooks spoil the broth’

An obvious lack of organisation here — three to one and still they haven't got things under control. This particular story has a happy ending, but apply the proverb to business organisation and the ending is not so fortunate.

In many businesses, for example, too many staff are wasting precious time with needless repetitive paper work. If the latter can be eliminated their time could be employed to better purpose and efficiency improved all round. That would be a happy ending indeed.

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AUGUST, 1956

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Piecework for Typists Cut Letter Costs

By JOHN A. ASH

Pool typists earn more than £10 per week at The Carborundum Co. Ltd., Manchester; but in the past year, their output has risen two and a half times, while the cost per letter has fallen by one-third. Another result of the introduction of payment-by-results is that once girls get used to this sort of money, they are not tempted to seek jobs elsewhere.

A SYSTEM of payment-by-results in the typing pool of The Carborundum Co. Ltd., Trafford Park, Manchester has put the typists—and the company—in a unique position. Nine girls and two juniors are doing half as much work again as was done formerly by 19; they are earning exceptionally high wages; and they are continually asking the company to give them more work. Each typist working the system is saving the company a considerable sum of money and freeing equipment and space for other employees. Instead of waiting a day or more for their dictated letters to be transcribed, letter-writers now get them back within an hour.

The system—which involves the use of remote-dictation equipment—was introduced in 1955, following the general principle of the incentives scheme which had been applied in the works. Shopfloor workers were expected to produce a standard rate of work per hour, and when this rate was exceeded they were paid at 25 per cent higher rates for each extra

unit of production. As a result overall production had increased by 35 per cent per man hour, the cost per unit had dropped by 10 to 15 per cent, and the workers' pay had increased by 20 to 25 per cent. No unrest had been caused because the workers, as a result of being given in advance ample verbal and written explanations, were able to understand the system and soon realized that they were taking home more money.



DICTATION.
Letter writers' desks are not cluttered up with dictating machines and spare spools. A power point in the wall and a special desk in each office are the only requirements at this end of the system.

In trying to keep the office workers on approximately the same wage scale as their shopfloor counterparts, the company had experimented with a system of group incentives, whereby the total salaries bill in each office department was related to the total volume of turnover handled by that department. An overall bonus (up to 33½ per cent) was based on the ratio of turnover to salaries.

This system was reasonably effective. But the drawback was that individuals and sub-sections tended to rely on other people's efforts to provide their bonus, and the harder workers were upset when their efforts were offset by slackness elsewhere. There was a tendency for any increase in efficiency to be tied to the rate of improvement of the slowest workers.

Moreover, in spite of the improvements brought about by the scheme, there were still considerable office bottlenecks, mostly arising from causes outside the offices. The usual scarcity of typists was aggravated by the fact that the factory is about five miles from the city centre, that the office hours are slightly unusual

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TRANSCRIPTION. When the typist finishes one lot of transcription, the junior takes it away and gives her a fresh lot. The typists' desks never become littered with "put-off" work. Typists may elect to use either electric or ordinary machines.

do more work; the typists reversed the procedure, and began to ask for more work.

An investigation showed that the pool typists' output varied between 250 and 1,000 lines per day, averaging 500. This low output, added to the mounting complaints of the letter-writers about the quantity and quality of the typing, convinced the company that a bold step should be taken, and individual payment-by-results introduced.

The typists were offered piecework rates which would enable them to earn more than £10 per week. They were expected to produce the equivalent of 840 lines per day, for which they would get their basic wage. If they produced less than 840, they would still get their basic wage, but if they produced more, for each line over 840 and up to 994, they could get .36d, and for each line over 994, .45d. A quality bonus of £1 per week was also introduced. If only one letter was returned by a letter-writer each day, the typist concerned received the full weekly bonus; if two letters were returned per day, 10s.; and three letters returned per day, no bonus. Thus, if a typist produced 1,000 lines in a day, and her basic rate was £6, she would earn the following:

5 days at 840 lines per day (4,200 lines) ..	£6 0s. 0d.
5 days at an additional 154 lines per day (770 at .36d) ..	£1 2. 11d.
5 days at an additional 406 lines per day (2,030 at .45d) ..	£3 16s. 1d.
Quality bonus ..	£1 0s. 0d.
Merit rate (paid in addition to basic wage) ..	£0 5s. 0d.
	£12 4s. 0d.

The cost would thus be .42d per line, which compares with .75d per line for a typist producing 2,500 lines per week at £7 15s. 3d per week, which was the normal rate with group bonus. Shorthand typists were expected to achieve a 630 line per hour standard.

The system's provisions were set out in simple form and presented to all the typists. Nine of them thought the rates were unacceptable and withdrew. However, within a week, with the help of evening and weekend overtime, the previous output was equalled, and within a month, the typing was more up-to-date than it had ever been. Another snag arose, however, when some of the male office workers expressed

envy at the high pay the girls were now earning. The management promptly offered to devise a similar payment-by-results scheme for them, and this offer has now been taken up by three departments, including the payroll department.

At that time, office workers were recording letters on their own dictating machines, then taking the spools and correspondence to the pool, where each girl was allocated a certain number of correspondents. Human nature being what it is, these visits to the typing pool were often prolonged and the typists were inclined to favour the better conversationalists. Thus a not insignificant part of two persons' working time was lost. It was estimated that in the seven and three-quarter hour day, the average working time in the pool was only six hours.

So the company decided to sever unnecessary personal contacts. This was done by introducing a remote-dictation system. In each letter-writer's office is a point into which he plugs a hand microphone. A census was made, showing the number of letters each department sent out daily and from the results an economical deployment of points was effected.

The procedure is simple. In the typing pool there is a bank of three recording machines. These are attended on a part time basis by one junior. When a correspondent un-hooks his microphone (fitted with stop, start and playback switch) a green light comes on on the appropriate machine. (Each recording machine has four feed points capable of taking four microphones, making twelve inter-connected points in all, each point being located so that it is available for a number of dictators.) The junior "listens in" and the correspondent gives his name and commences to dictate recording on a form the number of letters he has dictated, categorising them as "priority" or "ordinary."

On a "correspondence progress record card," the junior records the name of the correspondent, and the number of letters. She then inserts the card in a date/time stamping machine, which records the date and

the time started. When the green light goes off, it means that the correspondent has finished dictating. The junior again time-stamps the card, then takes off the used spool and replaces it with a clear one.

She then goes to the correspondent's office and collects his correspondence file and his dictation form. On this, he has noted the names of addressees and given code instructions such as "L" (listen before typing, X (alteration), O (extra carbons required) and so on. The junior takes both file and form to the pool, marries them with the spool, and puts them on a filing rack. When a typist indicates that she has finished one lot of work and requires more, the next spool and file is taken from the rack and given to her. She fits the spool on to her transcribing machine and continues to work. The job which she has just finished, plus a record of the number of lines taken, is "clocked off" and the junior returns the file and the typed letters to the correspondent. On the correspondence progress record are entered the typist's name, the number of lines and letters (which are added up progressively) and the time returned to the correspondent.

Each typist records on her own work sheet the number of lines which she has typed hour by hour so that she not only has an immediate visual record of her rate of earning, but also produces a pay claim which, after test checking, forms the basis for her wage payment. The company feel that the recording of work as it proceeds is, of itself, an important aid to higher output.

In the early stages, when a typist could not understand what was being said on a recording, she reported to the pool supervisor (a man), who invited the correspondent to come down to the pool and listen to his own voice. In next to no time, the quality of dictation improved considerably!

The method of recording progress also indicated the man who held a machine for 35 minutes, but made only five minutes' recording.

One of the original typists, who had been producing about 450 lines a

day, felt that she could not reach 840; now, with the system running smoothly, she often reaches the 1,400 mark. The average number of lines a day is 1,200 each girl. A 17-year-old typist, trained by the company is able to do 840 lines a day after six months in the pool.

Two-hour Service

The success of the scheme may best be seen by comparing the old and new set-ups. There were formerly 17 pool typists and two juniors, and they were often two to three days behind with their work. There are now nine typists and two juniors, and although the amount of work has increased by around 50 per cent, the time between dictation and the return of the typed correspondence averages less than two hours.

Since the inception of the system the labour turnover in the typing pool has been nil. The company's main embarrassment is that they find

it hard to give enough work to the pool, so that the girls may earn as much as they would like. In order to promote good relations between correspondents and typists, the company have made a film entitled 'The Dictation and Typing of Correspondence' which puts over the difficulties of both types of workers.

Whereas in the past, the 19 members of the pool often had to work overtime twice a week, the present nine members (although they would probably welcome the opportunity of earning even more money) cope with the work in the normal working day.

The company claim that the average output per typist has risen 250 per cent, and the cost per letter has fallen by 30 per cent. The second claim does not take into consideration the indirect savings on space, equipment and overheads. Nor does it take into account the vast gains arising from the abolition of delay in handling customers' correspondence.

But This Firm Found That —

Disbanding Their Typing Pool Raised Efficiency

By FRANK CONYERS

Richard Costain Ltd. adopted a typing pool system when they moved into their new headquarters building. But they soon decided that it did not suit their type of business—that the employment of individual secretaries, properly picked and trained, gave better and cheaper results.

FOR many years Richard Costain Ltd. had a number of offices scattered over London. These were brought together under one roof when the company moved into a magnificent new building in Westminster Bridge Road.

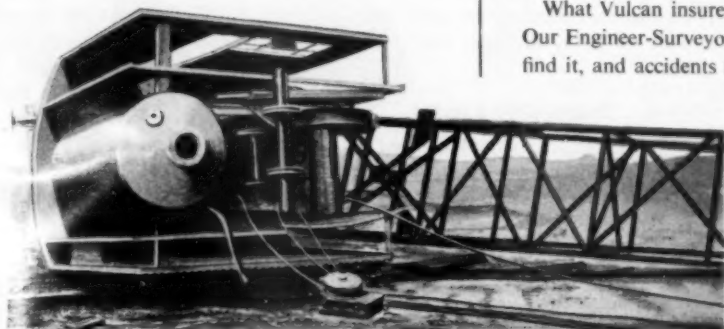
Naturally the move encouraged Costain to examine with great care the possibility of streamlining some

of their office methods. One idea which seemed attractive was the formation of a typing pool, where typists could work steadily through the day on correspondence and other matter recorded over a dictation-by-telephone system by the company's executives.

On the face of it, this arrangement was a logical and up-to-date develop-

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ment of the typing pool system which worked successfully in many large organizations. So Costain, having a progressive outlook on the mechanization of clerical operations (as might be expected of a large engineering concern) decided to try it.

At first, it seemed successful. The typing labour force was only about two-thirds of the number which would have been required if every executive had his own secretary.

But R. K. Bremner, the executive in charge of office management, is a man with an enquiring mind—a man who looks for indirect costs and not-so-obvious results. Soon he began to ask himself: *Is this indeed an economy?*

As a result of his investigations, further changes have been made. The recording machines are still in Costain's offices; but other uses have been found for them. The typing pool has been dispersed. And Mr. Bremner is convinced that overall efficiency has increased.

Nevertheless, he is the first to insist that what holds good in their case

may not hold good in others. For theirs is a specialized business, in which heads of departments are frequently away from the office, consulting, planning and superintending on-site operations. While they were away, work in the typing pool virtually ceased. More important, no information could be obtained concerning the operations on which they were currently engaged until they returned.

Intangible Cost

That, at least, is what happened at first. Then, almost imperceptibly, the executives concerned began to engage assistants. Rarely, however, were the newcomers described in this way. Sometimes they were designated "office juniors"; more frequently, "trainees"—although the training they received was negligible. They were there almost as office "stooges"; just to hold the fort, to reply to enquiries and to answer the telephone, often with the bare statement that their chief was not available. They provided no useful information, per-

formed no useful function. But—and this is the point which perturbed Mr. Bremner—their cost far outweighed the savings apparently brought about by the adoption of the typing pool. It is this sort of intangible cost—the cost of time wasted when the office chief is absent or when urgently-needed information is not available—that so often passes unnoticed when a direct saving (in this case in typists' wages) is made.

So it was decided to disband the pool and revert to individual secretaries. The accent is on the last word. Costain did not want to engage typists dignified by that title. And while they did not want to take on girls as personal assistants (the expression can give a totally wrong impression of the job in hand) they did want girls who would assist their immediate chiefs personally.

It was suspected that, on account of their training and even their temperament, the girls then employed in the pool were unlikely to be suitable for the jobs now envisaged. This proved to be the case; very few, says

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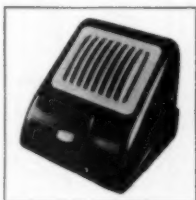
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| <input type="checkbox"/> P.A.Y.E. | <input type="checkbox"/> Other applications |

Mr. Bremner, ultimately stayed. But the changeover had to be gradual. At the outset it was recognized that the girls would have to be selected with care and trained on the job. With a need for 65 girls of this type, the operation could not be done overnight.

Girls of good calibre, background and basic education, as well as secretarial training, were required. So three leading training colleges were approached, and with few exceptions all of the labour force has been recruited from these. Coming straight from the college, the girls are paid initially £6 10s. a week, this being increased after three months to £7.

Thereafter, increases are given regularly, and all promotion is from within the existing staff. A very small number of top jobs as directors' secretaries carry really good salaries. If and when these become vacant, they too will be filled from the girls already employed. So the girls have every incentive to stay with the company.

When a girl joins the firm, the

nature of the job is explained to her carefully by Mr. Bremner, who has sole responsibility for engaging all office staff. She is told to say frankly if, after a reasonable trial, she feels she is not fitting in to the department to which she is assigned. In this case a transfer would be arranged. Her chief can express a similar opinion, of course.

Two-way Aid

She is reminded that although engaged for a specific post, at times when her own section is slack she may be called upon to help out with the work of any other department. It is pointed out that this is a reciprocal arrangement; that she, too, may be in a position when she wants that sort of aid but can ask for it only if she has given it cheerfully herself.

Above all, the girl is expected to learn all she can, within the limits of a secretary, about her department's work, so that it flows smoothly in the absence of her chief. She must

be able to answer intelligently any outside or inter-departmental request for information concerning the progress of work in her section; and to "brief" her chief before meetings. In every way she is trained to become a second hand and brain helping in the efficient running of the department for which she is working.

The reactions of both executives and the girls themselves have been excellent. The executives appreciate the real value of this standard of secretarial assistance. The girls feel they belong to a worthwhile group, finding their work satisfying because it is so obviously necessary.

The proof is in the extraordinarily low office labour turnover. Annual intake is not more than five or six girls, to fill vacancies caused by marriage or by parents moving out of the London area. Rarely do they leave to go to other jobs in London. But if a girl does wish to extend her experience outside that available in the company, every help is given her to obtain a suitable post.

THOUSANDS OF OFFICES

keep their files on 'Recordak' Microfilm

... because 'Recordak' microfilm files are compact, easy to use, readily referred to and permanent. One small reel contains accurate facsimiles of hundreds of office documents. The 'Recordak' High Speed Microfilmer (top right) enables you to do your own microfilming at the rate of 150 letter-size, or 350 cheque-size documents a minute. Easy reference to the microfilm records is made with the 'Recordak' Commercial Reader (bottom right). It's time you had this modern time and labour-saving filing system operating in your office.

RECORDAK

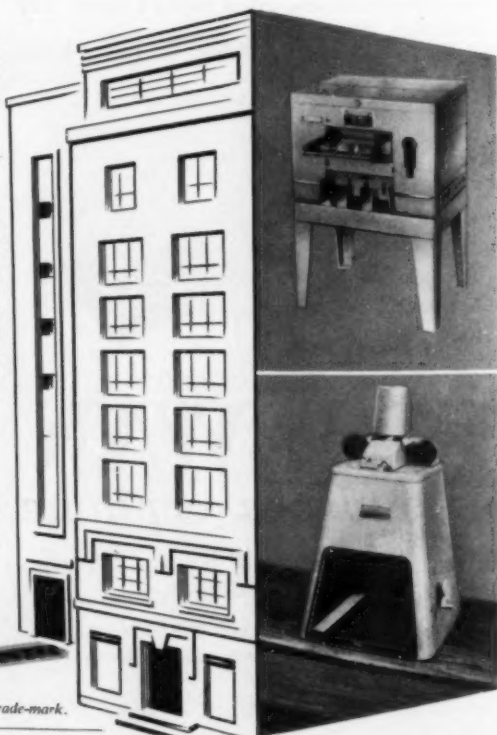
DIVISION OF KODAK LIMITED

1-4 Beech Street, London, E.C.1. Tel: Metropolitan 0316



Write now for more information.

'Recordak' is a registered trade-mark.



What were Eastern Counties sales last month?

THE FLEXIBLE CHARTING SYSTEM

It would probably be considered quick if you could get the answer to the above question by merely opening a drawer... or going over to a filing cabinet... or getting on the intercomm to what's-his-name... but would it surprise you if we stated we know a quicker, MUCH quicker, way?

A glance at the wall opposite your desk, and the correct answer would be there... on a MOVIGRAPH Charting Panel... we don't know of a quicker way, do you?

More and more businesses are installing the MOVIGRAPH CHARTING SYSTEM... it is the best contribution yet to Organised Planning, giving as it does a clear, complete picture of every aspect of present-day business. May we tell you more about it?

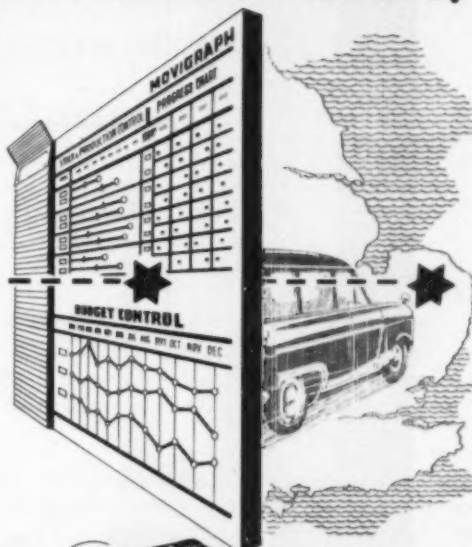
Movigraph

Made in England. British Patent No. 661692 and APN. Nos. 24543, 24544 also foreign patents.

The simplest and most FLEXIBLE Charting System in the World!

Full details from Dept. 'B'—

ADAPTA-CHARTSLTD. 129 HAMMERSMITH ROAD • LONDON, W.14
Telephone FULham 1063-1064



Suppliers of Charting Equipment to H.M. Government

33% floor space saved 25% more desk area

HERE is a new conception in office furniture... a complete work station embodying desk, side table, filing cabinet, card index cabinet, whatever you will... all in less space.

Each employee has more desk area, with improved access to information or supplies... all in less space.

Your installation can be planned to give flow production—easy movement of papers from position to position, from sales clerk to accounts clerk... all in less space.

The basic idea is a single work station made up of desk (plain, typing or comptometer) and pedestal, attached to auxiliary and end support and/or pedestals of deep desk drawers, stationery drawers or card index cabinets in whatever pattern you wish (there are over 60 to choose from)—add extra desk tops with pedestals or fitments in the most suitable formation, and you have efficiency without effort... all in less space.

And the cost is no greater than ordinary office furniture.

Even if space is not important, can you afford to overlook the advantages of greater output with less movement? You can start with one or two work stations and add as you expand. Just write 846 on your letterheading for free details by return.



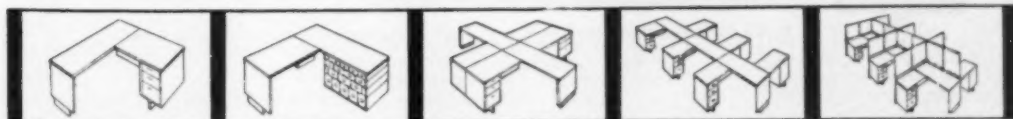
846

EIGHT-FOUR-SIX

SERIES
System **OFFICE FURNITURE**

Shannon System

THE SHANNON LTD.
50 SHANNON CORNER
NEW MALDEN, SURREY



846



Only the Advance Towelmaster Service

ensures* a clean, dry towel for everyone every time

What a difference the Towelmaster Service makes. Instead of sad, sopping roller towels or overflowing paper bins you have this gleaming white cabinet, offering a length of clean, soft, dry towel to every user—at all times. Why, from the point of view of prestige alone, the Towelmaster is a fine investment. And the cost? Only 5/- for a roll 45 yards long—enough to dry 180 pairs of hands.

There is no capital outlay. You can budget precisely for the year ahead. A minimum of two cabinets is

installed and maintained free of charge. All you pay is 5/- for each roll of towelling used. Minimum usage is one roll per cabinet per week.

And the Towelmaster is as efficient as it looks. Pull gently and down comes a length of snowy-white towel, sufficient for a really good dry. The used lengths automatically roll themselves back into the cabinet out of sight (into a separate compartment, of course).



The people to contact are: Advance Linen Services Ltd. (Dept. A10), Stratton House, Piccadilly, London W.1. Telephone: Mayfair 8886

* We collect and deliver **every** week; you always have a spare roll in reserve for each cabinet.

At the Wood Lane depot of George Cohen, Sons and Co. Ltd., many varieties of work are tackled. Most of the work is heavy, some of it is in the open air. The men who work there have big appetites and deep thirsts; they like their tea fresh and their meals hot. The dining accommodation is limited, which means that one lot of diners have to make room for another lot after half an hour, so the service has to be absolutely on the ball.

Elwyn Gullick is responsible for Wood Lane and for 14 of the group's canteens in other parts of England. An unhurried, unworried man, he has varying degrees of control over the catering arrangements in London, Birmingham, Sheffield, Southampton and Swansea. He visits these places at least once a year—in some cases once a week.

Mr. Gullick is not a conventional caterer. He is an accountant who came on to the canteen scene through budgetary control, found that he had a taste for the job and has been at it ever since.

At Wood Lane, there is one kitchen and two dining rooms of roughly the same size. The staff dining room adjoins the kitchen and the works dining room is directly above. At the moment these rooms are being re-furnished and many improvements are being made in the kitchen. **The Day's Work.** Catering operations at Wood Lane follow this timetable:

9.15—10.15. Two trollies make two journeys to serve 625 people with tea and sandwiches.

9.45—10.15. A trolley goes to various offices with tea and sandwiches for 200 people. At the same time, the tea point in the main office block serves about 100 people, and another tea point in a works across the main road serves about 200 people.

12.15—1.45 (approx.) Dinners are served in both dining rooms. Some 450 people take the full meals.

From 3.0 onwards the morning break arrangements are repeated, cakes being sent out instead of sandwiches.

There are separate dining rooms

for senior executives and directors, and a separate bay in the kitchen to cook for them.

How the Work is Done. To cope with this job, Mr. Gullick has the following staff:

Kitchen. Chef, assistant-cum-passtry cook, vegetable cook, three assistants, one reserve.

Staff Room and Office Tea Service. Three assistants, one reserve.

Works Dining Room and Tea Service. Six assistants, one reserve.

Tea Production. One assistant.

In addition, there is a satellite supervisor who looks after two separate canteens, two tea points and the

directors' and executives' dining rooms; one directors' cook; one senior executives' cook; and two part-time waitresses.

Wages are paid at a basic rate of 2s. 4½d. an hour to assistants, whose normal hours are 8.0 to 4.30. A wage increase was given recently on "merit only"—three people did not receive it. A bonus of 10s. a week is paid for attendance, 2s. being lost for each day of absence and 1s. for each half-day. Four days of absence wipes out the bonus altogether.

Menu Planning. In consultation with Mr. Gullick, the chef does all the buying for the Wood Lane canteen and also acts as central buyer and storekeeper for the satellite canteens. The satellite supervisor draws stores for the executives' and directors' meals but herself buys "special" items for these dining rooms.

Menus are drawn up well in advance by the chef, Mr. Gullick and other senior members of the staff. Full consideration is given to the customers' tastes, the capacity of the kitchen (which is very small) and, above all, the cost position.

Here is a typical day's menu in the main dining room:

Tomato soup	4d.
Roast beef, Yorkshire, cabbage, new potatoes	1s. 9d.
Pork chop, tomato, garden		



Elwyn Gullick, manager of this and other canteens belonging to the 600 Group, discusses tomorrow's menus with his chef, Mr. Gomme.

An Accountant Runs This Canteen

By WINIFRED McCULLOUGH

Senior Canteens Adviser, Industrial Welfare Society

Careful budgeting of all food items places the Wood Lane canteen of George Cohen, Sons and Co. in a better financial position than most industrial catering units. Their costing figures will help firms which fix portion sizes and prices by hit-and-miss methods.



One of the executive dining rooms. Directly above the kitchen, it is serviced by a lift. But service in the main canteen has priority because works personnel may spend only a 30-minute lunch-break there.

peas, chips	2s. 6d.	half-sandwich 4½d. Allow ½oz. Average cost 3s. 3d. per lb. = 1.7d. per filling. (From 2s. 6d. 12oz. tin, get 18 slices.)
Fish cake, tinned	1s. 3d.	If other fillings are used, cost must not exceed 60 per cent of the proposed selling price, which must be within the above price range.
chips	1s. 4d.	
Luncheon meat salad	5d.	
Apple and blackcurrant	5d.	
tart	5d.	
Blancmange	5d.	
Prunes	5d.	
Rice pudding	1d.	
Custard		

Watching the Cost. As might be expected of an accountant, Mr. Gullick is cost-conscious to a marked degree. The figures below are working costings used every day in the canteens under his control. They are followed exactly and could well serve as a model for other catering organizations. Only a few examples are given here, but every item on sale has a similar budget costing.

Sandwiches, Rolls, etc.

BREAD, per slice ½d. Cut 40 from quartern loaf. Cost 1s. 3½d. per quartern = 0.4d. per slice.

BREAD AND "MAGIC" MIXTURE, per slice 2d. Spread 24 from ½lb. of mixture. Cost 1s. 8½d. per lb. = 0.84d. per spread. (Sell in cubes, 24 from ½lb., at 1½d. per cube.)

DAIRY BUTTER, per cube 2d. Cut 24 from ½lb. Cost 3s. 6d. per lb. = 0.9d. per cube.

CHEESE: Roll 5d., half-sandwich 4½d. Average filling ½oz. Cost at 2s. 6d. per lb. = 1.25d. per filling.

HAM (GAMMON): Roll 7½d., half-sandwich 7d. Allow ½oz. Cost fluctuates. These prices are O.K. up to 7s. 6d. per lb. = 3.75d. per filling.

PORK LUNCHEON MEAT: Roll 5d.,

sugar 4½d. = total 1s. 4½d. Sales: 20 works cups at 2½d. each = 4s. 2d. (2s. 9½d. — or 67½ per cent — profit.) 24 office cups at 2½d. each = 5s. (3s. 7½d. — or 72½ per cent — profit.) With homogenized milk, get at least 24 works or 30 office cups.

COFFEE. Serve only in 8oz. cups (maximum) not filled to brim, half milk, half water. Maximum cost of milk 2½d. per cup; of coffee or essence ½d. per cup. Thus total cost must not exceed 2½d. per cup. Sell at 4d.

SQUASH. Sell in 8oz. glasses at 4d. each. Not to cost more than 2½d. per glass.

Main Meals (Cold)

OX TONGUE OR GAMMON HAM. Aim at 2oz. portions, maximum cost 9½d. Sell at 1s. 1d. per portion.

PORK LUNCHEON MEAT. If 18 portions from 12oz. tin, sell at 2½d. each. If 12 portions from 12oz. tin, sell at 4d. each. Where 4lb. tins are used,

Continued on page 130

Hot Snacks, etc.

TOAST: Dry 1d. per slice; spread with "Magic" (at 24 to ½lb.) 2½d. per slice.

BACON: Maximum cost 2½d. Sell at 4d.

EGG (BOILED, POACHED OR FRIED): Sell at 6d. while maximum cost is 4d.

BAKED BEANS OR SPAGHETTI: 3½d. Five portions from 16oz. tin costing 10d. (For salads, get 20 portions from tin, sell at 1d., cost ½d. per portion.)

WELSH RAREBIT. Following recipe makes 12. Sell on one round of toast at 8d. each. 1lb. grated cheese, one dessert spoon mustard (dry), damped with milk (not sloppy) and stirred. Toast spread with mixture, leaving an "edge" all round; put under the grill to "bubble" and brown.

Beverages

TEA. Use 1-gallon packet (1½oz.) and one gallon of freshly boiled water. One pint of milk—put into cups first—provides 9 pints of liquid. This makes 20 ½-pint works cups or 24 8oz. office cups (not filled to the brim in either case). For 20 works cups or 24 office cups, allow 8oz. sugar. Cost: tea 5½d., milk 7d.,



The kitchen at Wood Lane in the process of "modernization while you work." New stainless steel sink units are replacing the older types of equipment. These "before" and "after" pictures show the improvement.

KEYSTONE KNITTING MILLS USE



New Welbeck

Day and Night—
Throughout the Year!

... to pick up the accumulation of waste material in the lingerie department, and thus preserve the intricate and delicate machinery which weaves nylon thread into the sheerest nylon stockings. The NEW WELBECK is recognised throughout the world as the most efficient of all industrial vacuum cleaners.

- ★ No dust bag to impair efficiency.
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Suppliers of
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AUGUST, 1956

Kwick-dry

"The Towel that Really Dries—as the Name Implies"

PAPER TOWELS

BEWARE!
GERM
SPREADING
COMMUNAL
TOWEL



Progressive firms throughout the country are using "KWICKDRY" PAPER TOWELS in place of the old germ-spreading communal roller towel.

A clean fresh "KWICK-DRY" for each person and every occasion encourages cleanliness and reduces absenteeism.

It is far cheaper too because it cuts Laundry Bills, Towel Losses and Time Waste.

One "KWICKDRY" will dry the wettest hands and not disintegrate.

Supplied in Rolls for the AUTOMATIC-CONTROL DELIVERY CABINET or flat interfolded in packets for which suitable Cabinet is also available.

No possibility of Chapped Hands and Faces or irritating queues, as with Hot Air Drying Equipment.

**ONLY
1 AT A TIME**

is dispensed from

AUTOMATIC-CONTROL DELIVERY CABINET



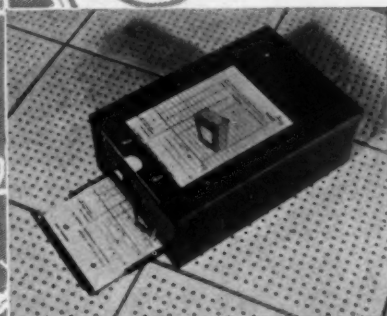
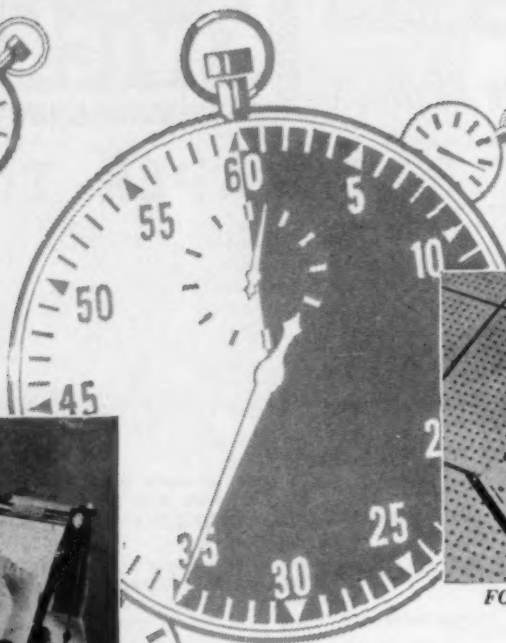
"KWICKDRY" TOWELS are COMPLETELY ENCASED in this cabinet until used, thus being free from exposure and contamination.

Full details on application to Towel Dept.,

FREEDER BROTHERS PAPER MILLS

BRIMSDOWN • ENFIELD • MIDDLESEX
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Beating the times

Speaking of the application of "Econoset" Continuous Stationery and the "Econojet" Typewriter Attachment to the typing of Invoices, Works Orders, Despatch Notes, etc. a customer said—

"It has saved some 50% of our typists' time, no overtime now—they beat the clock easily."

May we show you how you too can beat the times by

- Saving time in the preparation of essential forms —
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- Providing information simultaneously to all departments — without incurring capital cost on ancillary equipment?

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Business EQUIPMENT SURVEY

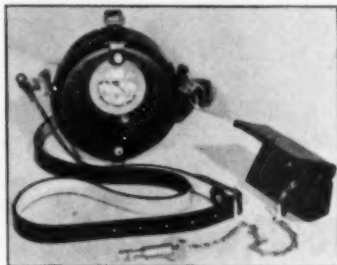
NEW AIDS TO GREATER OUTPUT AND LOWER COSTS

FOR YOUR OFFICE

Checking the Checker

A NEW watchman's portable clock is described by the manufacturers as the first equipment of its type to be produced entirely in Britain.

This is how the system works. Small station boxes containing numbered keys are secured at different points around a building. When the watchman turns each of these keys in the portable clock, the station



Eight-day Movement

number (printed in red) and the time (printed in black) are recorded on a tape inside the clock. The portion of tape that is used can easily be removed for day-by-day checking.

The clock can be opened only with a master key. It weighs 4lb., and is enclosed in a leather carrying pouch with shoulder strap. An eight-day movement is incorporated, so the equipment needs no supervision during weekends and holidays.

Each tape accommodates more than 1,750 recordings. The number of stations which can be incorporated in a "circuit" is practically unlimited.

Enquiry Ref. No. O. 8/1

Ear Comfort

MADE of a soft washable foam rubber, a new telephone earpad helps to cut out noise interference while telephone calls are being made. Another advantage is that it pre-

vents a woman's ear-rings from being pressed against her ear.

The pad is held into position by a dry adhesive. This makes it particularly easy to remove for cleaning. There is no stickiness.

Enquiry Ref. No. O. 8/2

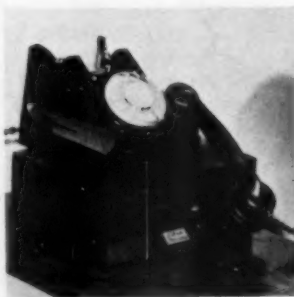
Loudspeaking Unit

DESIGNED for use with all types of external telephone and most types of internal telephone, the new *Fonamp* is a self-contained battery-operated three-stage amplifying unit, incorporating the latest range of low-consumption valves.

The equipment is simple to use. When a call is received, the amplifier is automatically switched on by placing the telephone handset on the rest provided. This amplifies the caller's speech to a comfortable "room" level. At the same time the recipient of the call directs his own speech at the acoustic reflector on the front of the *Fonamp*.

The aluminium cabinet, finished in black-wrinkle enamel, measures 10in. by 7½in. by 4in. high.

Also available is an external



Simple to use

speaker which can be switched to another room if desired, enabling a third party to listen to both sides of the telephone conversation.

Enquiry Ref. No. O. 8/3

New Control System

A NEW method of visual planning is incorporated in the *Disponent* wallboard. The equipment consists of 120 vertical coloured columns, which can be grouped as required and raised or lowered against a variable vertical scale.

Each column has its own plastic control wheel, and the movement up



Columns raised or lowered

or down is so simple that the value of the column can be altered almost instantaneously. A useful feature is that the contents of the index can be made secret simply by raising a flap and locking it into position.

Signals can be inserted at any point and here too a colour code can be used if required. The whole unit is housed in a handsome lockable cabinet.

Disponent is suitable for such applications as stock control, order progressing, materials control, and recording sales statistics. The use of

* Equipment included in this survey is selected for its new value alone. The names and addresses of the manufacturers or distributors of items mentioned can be obtained by writing to the Editor, BUSINESS, Mercury House, 109-119 Waterloo Road, London, S.E.1, quoting the appropriate reference numbers. Manufacturers are invited to submit details of new and interesting products for consideration. An original photograph should accompany each item submitted.

Business EQUIPMENT SURVEY

columns of different colours facilitates the breakdown or grouping of information.

Dimensions of the unit are 55in. by 28in. by 6 in.

Enquiry Ref. No. O.8/4

Private Radio System

HERE is a system which enables a central control point to make immediate contact with selected personnel—no matter where they go inside a prescribed area. Known as *Radiopage*, it differs in principle from other staff location systems. Instead of attracting the attention of the person required—and distracting everyone else—with broadcast messages or visual indicators, it transmits spoken messages privately and individually.

The messages are picked up by pocket-sized battery-operated radio receivers carried by the people concerned. Each of these receivers (which use transistors instead of valves) is tuned continuously to one of the 50 frequency channels on which messages can be transmitted.

The only installation is a loop of



Light, simple—and cheap

insulated wire attached to the outside or inside of a building, or fixed at a convenient height above the ground. This loop is connected to a transmitter which may be located up to 100ft. from the central control point. The power required to give complete coverage within a particular loop depends on several factors, but a transmitter with an output of 25watts will generally cover 20 to 30 acres.

A message can be sent out on any one of the 50 channels, the trans-

mitter being crystal-controlled on each of them. Only receivers tuned to that channel will pick it up. This feature enables strictly private calls to be made. On the other hand, there is no limit to the number of receivers which can be used on each channel.

Each receiver has a built-in crystal loudspeaker giving adequate volume for messages to be heard without putting the instrument to the ear. Life of the 4-volt mercury cell which supplies power is 500 hours when used under continuous working conditions—although the exact value depends on the number of messages received. A replacement costs a few shillings.

When it is not carried in the pocket or propped in a vertical position, the receiver can only be laid flat; then a mercury switch automatically disconnects the battery.

Once installed, the *Radiopage* system requires negligible maintenance.

Enquiry Ref. No. O.8/5

Tough Tape

REINFORCED with rayon thread, the new *Tielon* cellulose tape is both strong and attractive. Adver-



"Forget the ten minutes, Charlie"

... "Nobody minds a good driver like you taking a break whenever he needs one. ... But who kept you waiting these forty minutes for your load?"

... "Down at Bitsanpieces Ltd. that was—half the stuff not even labelled—put me out for the rest of the day, it did!"

... "Right ... I'll ring them now and make sure you're not delayed there again!"

... "Thanks, Guv—that's what I call the right way to run a fleet!"

Another of the ways in which drivers are helped—HUMAN RELATIONS IMPROVED
EFFICIENCY INCREASED—AND TRANSPORT COSTS REDUCED ... by the

SERVIS RECORDER SYSTEM

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to your particular needs
supplied with zest and
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BUSINESS

tising messages, etc. can be printed on it in a variety of colours.

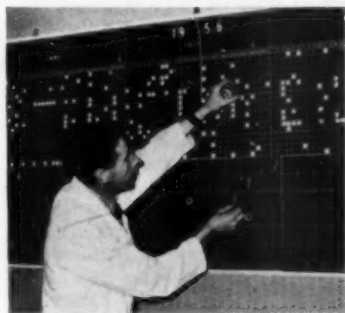
The tape is available in 500-yard or 1,000-yard reels to fit the manufacturers standard dispensers.

Enquiry Ref. No. O.8/6

'Electric' Symbols

PRINCIPLE of a new visual control system is that specially-treated plastic symbols, numerals and indices have a static electricity content which makes them adhere to a sheet-plastic wallboard.

Boards are supplied with rulings, spacings and other permanent features to suit specific applications. They can be of any size, colour and design. Waterproof and weather-proof, the material can be written on



Calling all executives

with special waterproof ink or with an ordinary Chinagraph pencil, and can be cleaned with a damp cloth.

Like the boards, the symbols can be of any size, colour and design required by the customer. They remain firmly in position even when rubbed, but can easily be picked off the board.

Main advantages of the new system are lightness, simplicity and low cost. Potential applications include the control of transport vehicles, or the movement of materials inside a factory; sales and promotional recording; the progressing of orders; and the timing of staff.

Enquiry Ref. No. O.8/7

Plastic Ring Book

THE new *Duraflex* multi-ring book is made of a dark-blue hard-wearing plastic material which so closely resembles leather that, say the manufacturers, only an expert can tell the difference.

The book holds 11in. by 8½in. sheets. Feint and plain sheets in



Pocket for loose notes

refills of 75 are available; so is an index.

On the inside back cover is a tight-fitting pocket for holding loose notes, etc.

Enquiry Ref. No. O.8/8

New Metal Desks

ASPECIAL feature of the new *Airline* desks is the attractive design of the pulls. High class tooling ensures that all contours are accurately formed, and each pull is neatly finished off with polished extruded strip.

Pedestals have rounded corners, and are supported on convenient island bases. Desk tops are covered with non-glare linoleum, which provides a washable and durable writing surface. The tops are available in black, green and grey.

Standard finishes for the desks are plain grey and olive green. But metallic grey, black, maroon and other colours are supplied at a slightly extra cost.

Various styles are available. One popular model is the *1760-FB* executive desk, measuring 30in. by 34in., with four box drawers, one quarto vertical file drawer and a knee-space drawer. Also available is a conference model on similar lines, but with 72in. by 40in. top overhanging 6in. on both sides and at the back.

All models are fitted with automatic locking devices controlled by



the knee space drawers. Box drawers are equipped with one vertical partition, and extra partitions are available.

Enquiry Ref. No. O.8/9

For Production Control

INCORPORATED in the *Systemette M.A.S.* spirit duplicator is an entirely new type of masking and selection device. Copies—whether complete or single or multiple line selections from the original documents—are obtained from a single run through the machine.

For a relatively small outlay, the equipment makes possible the use of efficient control methods even in the smallest factory. In addition to line selection work, the machine can be employed as an ordinary office duplicator for the production of internal forms or for any type of standard duplicating in up to seven colours. It handles any size of paper up to brief.

A silent-drive heavy-duty electric motor, with built-in oil-immersed gear reduction unit and clutch, ensures long life and trouble-free operation. *Enquiry Ref. No. O.8/10*



Above: The new *Systemette M.A.S.* spirit duplicator.

Left: *Airline* conference desk.



THE MASTER CLOCK

Smiths Pendulum Master Clock—independent of the mains for its time-keeping—controls any number of slave clocks, time recorders, bells and hooters, etc. Wherever accuracy and uniform time is essential ECS clocks have proved their varying efficiency.

B.O.A.C. choose English Clock Systems

Landing or taking-off BOAC make no allowance for bad timing. For BOAC at London Airport there is only one time—the right time. Not just on one clock, but on every clock. Because they must have this split-second accuracy and complete synchronisation BOAC have installed an E.C.S. Master Clock System. This particular installation comprises over 200 slave clocks and 15 Autoprint Time Recorders, all controlled with absolute efficiency by Smiths Pendulum Master Clock. The slave clock dials and cases were specially designed to harmonise with the modern style and decoration of the new Airport building.

BOAC are among the many large and small Industrial and Commercial companies all over the country who have learned to rely on English Clock Systems, the perfect Timekeeper.



Flush fitting model used in managerial offices.



Surface mounted clock used in general office areas.



Surface mounted clock used in canteens and workshop areas.

ENGLISH CLOCK SYSTEMS

179-185 GT. PORTLAND ST. LONDON W.1 LANGHAM 7226

Branch Offices in Glasgow, Manchester & Belfast

A BRANCH OF THE CLOCK & WATCH DIVISION OF **SMITHS** S. SMITH & SONS (ENGLAND) LTD.

G.13

INDUSTRIAL EQUIPMENT

MACHINE TOOLS

Speed Selection by Dial

SHOWN for the first time in Europe at the recent International Machine Tool Exhibition, the *Cleveland Model AB 1½in. Bar Automatic* has a panel on which the speeds and feeds for each turret tool station can be pre-set by moving a pointer over a dial.

A wide spindle speed is steplessly variable without the use of pick-off gears. Switches and dials on the control panel control individually the forward and reverse spindle speeds and enable ten spindle speeds to be pre-selected for a machining cycle. All speeds are automatically controlled. This feature increases efficiency by providing the most economic cutting speeds for each machining operation. It also considerably reduces set-up times.

After spindle speeds and feeds have been determined for each turret tool station, they can be transformed into information suitable for dialling by means of a conversion chart on the control panel. The setting on the dial can be changed while the tool is cutting—costly cut-and-try methods of setting-up are eliminated by this feature.

Maximum round bar capacity is 1½in. diameter, and the tool turret has a 5in. stroke. Spindle speed range is from 40 to 3,200 r.p.m. Ten automatic speed changes can be dialled for each machining cycle. Cross slides have a 4in. travel and are 6in. wide. Bar feed is 9in., and the maximum distance between chuck and turret faces is 8½in.

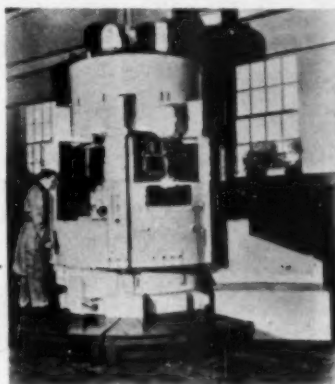
Enquiry Ref. No. F.8/1

Reduces Cutting Times

EMBODYING a number of novel features for reducing both cutting times and idle times, the hydro-electrically controlled *L type 10in. eight-spindle Multi-au-matic* dispenses with the need for fixed cams, as the screw feed to all heads has an electrically controlled timing mechanism.

Other features include independent feeds and speeds at each working station; square lock construction with hardened and ground ways for all saddles and slides; automatic chucking; and positive-drive spindle synchronizers.

Eight models are available; 10in., 14in. and 18in. six-spindle; 10in., 14in. and 18in. eight-spindle; 10in. 12-spindle; and 10in. 16-spindle. General features are similar on all



Eight models available

machines, but capacities and head arrangements vary.

An independent screw-type feed mechanism is provided at each working station. A hydro-electric system automatically controls feed and traverse stroke for each head. The system comprises a control drum with adjustable cams and a detector switch unit. The drum is situated above the head for setting its entire cycle, including down traverse, coarse and fine feed, jump feed, dwell and return traverse. Combined traverse and feed stroke is 16in. maximum, and any part of the total stroke can be used for complete cycle. The minimum traverse stroke is ½in. and the minimum feed is zero.

Two different feed rates can be used in one head cycle by means of hydraulically-operated fine and coarse

feed clutches. Where required, dwell is adjustable. Interlocks between feed and index prevent indexing until all heads are up, and safety clutches are built into the feed mechanisms. Eighty-one feeds are available, from 0.0025in. to 0.0625in.

To protect both machine and operator, pressure switches are used on the hydraulic and lubricating systems.

Enquiry Ref. No. F.8/2

Setting-up Time Reduced

An entirely new method of strip forming was introduced at the International Machine Tool Exhibition last month. Using the new *Heenan Hydraulic Multiform*, semi-skilled labour can set up the machine in one-tenth of the time which highly skilled men would spend in setting up conventional equipment. On the average, this means a reduction from about two hours to about 12 minutes.

The new machine employs hydraulic operation throughout and dispenses with mechanical movement, apart from the actual tool slides. The principle is based on a servo valve, actuated by a master camshaft working on a pressure of a few pounds, which is converted into the full tonnage of the machine at the operating stations.

The master camshaft is at the front of the machine, between two centres. The cams actuate small toggle arms which are connected to Bowden-type cables connected, in turn, to the servo valves. In this way it is possible to have accurate control of the servo valves with only very light pressure on the cam faces.

The cams are sawn from steel plate, and owing to the very light pressure exerted on them, they do not have to be hardened in any way. It is therefore an easy matter to alter



Faster, smaller, safer

Business EQUIPMENT SURVEY

the movement at any operating station by filing the cam whilst it is in position on the shaft. Cams and shafts are thus cheaply produced, and a separate set can be included in each set of tools.

The master cam set may be removed from the machine and replaced without any setting-up. At the same time, the original movements and timings to the feed mechanism, stationary grip, horizontal press, cut-off station and all forming and vertical stripping slides, are obtained without further adjustment. Thus a change-over from one type of production to another can be made with a negligible loss of time.

The camshaft is fluid-driven, giving an infinite choice of speeds from zero to the rated maximum of the machine. Due to the absence of moving parts on the outside, the machine is safer, and takes up 50 per cent less floor space, than its mechanically-operated counterpart.

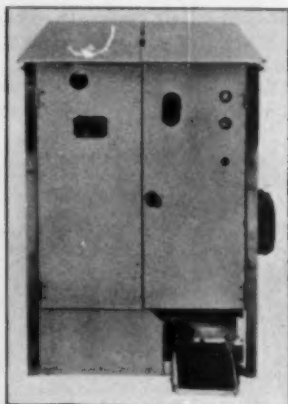
Enquiry Ref. No. F.8/3

PACKAGING

Strapping and Securing

THE *Gerramatic* machine straps and secures boxes, cartons and irregular shaped packages with $\frac{5}{16}$ in. steel band. Tension is predetermined, and applied uniformly irrespective of the size or shape of the pack.

The machine is operated by a foot pedal, and tensioning and sealing are



Predetermined tensions

effected automatically. Seals in coils of 5,000 and coils of strip of 1,000ft. are housed inside the machine, thus making the unit self-contained and compact.

It will handle packages weighing up to 100lb. One unskilled worker, working a nine-hour day, can apply up to 3,500 bands, it is claimed.

Enquiry Ref. No. F.8/4

MECHANICAL HANDLING

Heavy Handling

AIMED at reducing operator fatigue where heavy loads are constantly being handled over long distances, the *POES 2* pallet truck



Reduces fatigue

has a convenient stand-on riding position and the minimum number of controls. The truck is battery electric powered, and has a capacity of 6,000lb. or 4,500lb., with fork lengths of 36in., 48in., or 60 in. The complete stand-on traction, control and battery unit adds 25½ in. to the fork length, and the overall weight of the truck is 2,730lb.

Controls include a foot-operated "dead man" brake, a one-hand steering wheel with direction indicator, a control handle giving forward or reverse travel at infinitely variable speeds up to 5 m.p.h., and a push button controlling the lifting and lowering of the forks and platform. A regenerative braking system slows the truck automatically on down grades, and at normal speeds feeds

power back to the batteries. Rheostatic braking at lower speeds enables the truck to be controlled almost to a standstill, so that it is only necessary to use the "dead man" brake when parking, or in a sudden emergency.

The new truck is capable of turning in its own length, and the sensitive steering and traction control enables it to work rapidly in the most confined spaces.

Enquiry Ref. No. F.8/5

WELFARE

Robot Announcer

SUITABLE for announcing shift changes and tea breaks, a new automatic unit can reproduce 25 pre-recorded announcements for relay over a loud-speaker system. Messages recorded on the standard magnetic tape—a continuous loop 3in. in width—last for up to 30 seconds. If required, a longer tape makes possible messages up to four minutes.

Announcements are triggered-off either by a press-button or by a master clock mechanism which ensures that messages are relayed at fixed times without human attendance. Push-buttons can be mounted remotely so that broadcasts can be initiated from other parts of the premises.

As the tape is played, it passes through a guide into a Perspex-fronted casket, where it drops naturally into folds. The continual loop of tape eliminates the need for spools and rewinding.

Enquiry Ref. No. W.8/1



The unit is designed in panel form so that it may be mounted in a standard rack frame

CONTINUATION SHEET

and it is most essential that we obtain some first class lifting and stacking trucks to ease the serious congestion throughout the works. Will you contact the best people and arrange

ENQUIRIES

Full details of the "Sherpa" range of trucks on request from Dept. B. Demonstrations arranged on-the-spot.

Sherpa

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SALISBURY PRECISION ENGINEERING LTD.
1 BUCKINGHAM PALACE MANSIONS, LONDON S.W.1
SLOane 9934-5-6

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NOW! STONEHOUSE PRESENT Rustproofed steel slotted angle IT'S HOT DIP GALVANISED



Use Stonehouse **HD** Slotted Angle for Heavy Duty indoors and out.

Standard Pack—twelve 8 ft lengths, 3" x 1½" x 14g. complete with 75 cadmium plated nuts and bolts

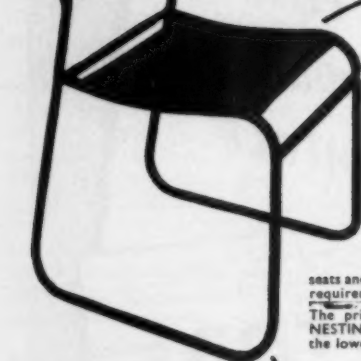
£6.16.0

... Compare this price with paint-finished slotted-angle!

For full details of Stonehouse HD Slotted Angle write to Department B1, Pressed Metal Division, Williams & Williams, Roften Works, Hooton, Cheshire. Or call at our London Showrooms—36 High Holborn, W.C.1, for a practical demonstration.

Part of a typical Stonehouse racking installation designed and erected by our Customers.

Styled for Stacking

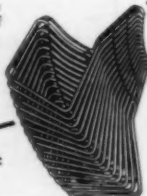


REDRO NESTING CHAIRS are constructed of $\frac{1}{2}$ in. or $\frac{3}{4}$ in. high quality tubular steel, designed to give the maximum comfort for normal seating.

The chairs are light to handle, easy to keep clean, and when not required for use, are economical in storage space. Nesting one upon another, a stack of 15 chairs occupies a space only 18 in. wide by 3 ft. deep.

The REDRO NESTING CHAIR is available in 12 colours of stove enamel, and fitted with 9 different types of seats and back which meet with most specialised requirements.

The price of the REDRO NESTING CHAIR is one of the lowest on the market.



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REDRO LTD. (Dept. 28) Cogan Street, Hull

THIS AUTOMATIC SECRETARY Takes care of Your Detail and Cuts Your Work

NO OTHER means will do more to ease your work and free you from petty details and many minor matters.

For this "Desk Secretary" is a complete desk organiser. It keeps in orderly form and helps you to deal swiftly and systematically with all your papers and correspondence, and automatically reminds you of all commitments and matters to be attended to.



This Almost Human Device

Shows you all letters or papers requiring attention each day; Insures correspondence answered on correct day; Looks after matters pending and brings them continually

to your notice until finally dealt with; Prevents loss of all important papers; Keeps your desk clear of litter with all your papers systematically filed.

Supplies Limited - Order To-day

-----Fill in and Post NOW-----

SHAW'S OFFICE SERVICES & SUPPLIES LTD.
109 Waterloo Road, London, S.E.1

I enclose remittance of _____ for which please send me:

Desk Secretaries (F'cap) with special metal trays at 31/6 each.
(including tax and carriage)

Name _____

Address _____

B/1

CANTEEN PROFILE - 2

Continued from page 120

get 20 portions to the lb. and sell at 2½d. each.

CORNEB BEEF. Get 20 portions per lb., cut thick to avoid waste. Average price 3s. 3d. per lb., therefore portion cost is 2d. Sell at 4d.

Main Meals (Hot)

ROASTS. Allow approx. 1½oz. cooked, boneless on plate. (About five portions to lb. as delivered.) Sell, with gravy, at 1s. 1d. per portion (Max. cost 9d.)

FISH. Aim at three fillet portions per lb. Sell at 11d. Maximum portion cost 7d. (often less.)

LIVER. Get six portions per lb. Average cost 3s. per lb. = 6d. per portion. Sell at 11d.

Vegetables

POTATOES. Aim at 12 portions per 7lb. Average yearly cost 2½d. per lb. *Chips* 4d. (one shovel equals about 6oz. cooked.) *Mashed* 1½d. per No. 20 server (1½oz.—2oz.), normal serving two for 3d. *Roast* 3d. per portion; select potatoes of regular size and aim at three largish halves per portion. *Boiled* 3d.; aim at four largish halves per portion.

GREENS. From 1lb. get four portions while 8d. per lb. Aim at cost of under 2d. to sell at 3d. per portion.

CARROTS. From A2 tin (1s. 1d.) get 12 portions to sell at 2d. each. From A10 tin (4s.) get 48 portions to sell at 2d. each. (In both cases cost is approximately 1d. per portion.)

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BUSINESS

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Man on the Spot. Don't imagine that Mr. Gullick sits at an office desk and cooks up figures all day. He is a hard-working caterer. For example, he is in the works dining room or office dining room for the greater party of every meal-break

The backbone of Mr. Gullick's record system is a plain duplicated memo book. In such a book everyone who produces any item must enter the materials issued and the amount left over, to be reserved or returned to store. Every person who sells has a similar book with the number of starting and finishing portions entered. Top copy goes to Mr. Gullick; carbon stays in book. "We could use forms, but ordinary assistants are not used to forms, which frighten them. But no-one minds writing in an ordinary little book."

Plain—But Bright. The dining rooms are light, airy and very clean. They are plain and simple, without flowers, pictures or curtains, yet there is no feeling of institutionalism or dreariness, perhaps because they are well suited to the job of feeding quickly the hungry hard-working men who are their customers.

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Cigarettes are sold from the trolleys, from tea points and from a kiosk. Sweets are sold from the trollies on certain days only. It is felt that too big a sweets sale works against flour confectionery sales, and might result in the pastry cook being only partly employed, thus adding to the production cost of cakes and puddings.

Final Points. Many other things catch the eye: The speed and neatness of the service; the absolute absence of food handling; the good housekeeping of kitchen and stores, cloakroom and office; the instant friendly answers to every question by every member of staff; the two smiling coloured women behind the works canteen counter. ("... We asked the other assistants first, of course, and they agreed to have them.")

AUGUST, 1956



KS MODEL

Price 25/-
(illustrated)

Takes all sized pencils through specially adjusted guides.



L MODEL

Price 21/-

For round or hexagon standard size pencils.



Stands are finished silver-grey enamel and the receptacle is stainless steel.

Back to the Point that BOSTON has made for over 30 years

Yes, the famous Boston sharpener is back and better than ever. It is now made in England with immediate delivery. A beautiful point to every pencil and no breaking—the 30 cutting edges ensure it. Efficient stop prevents pencil waste.

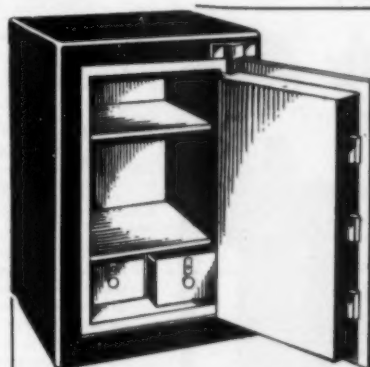
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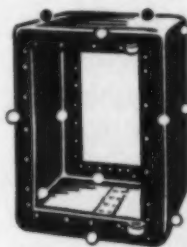
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Fire-Resisting Quality Safes

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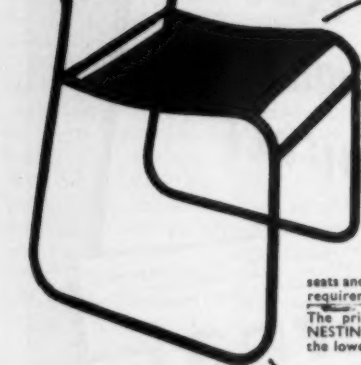
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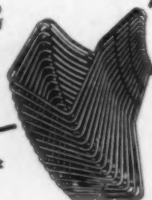


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CANTEEN PROFILE - 2

Continued from page 120

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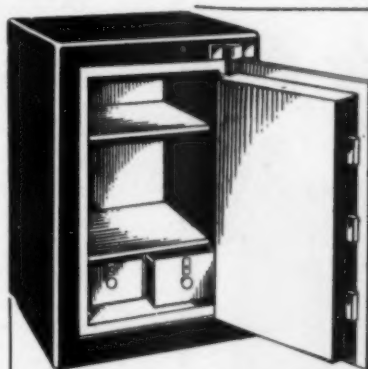
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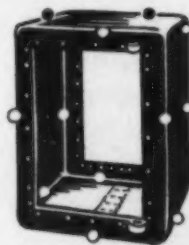
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WITHOUT FLAKING**

**PAINTING AND
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The extra deep-drawing qualities of ZINCOR Strip Mill Electro-Galvanised Steel Sheets are clearly conveyed by the unretouched picture above. These sheets are available for immediate delivery in the U.K. or for shipment to other markets from the mills of our principals, S. A. des Tolerics Delloye-Matthieu. Details and samples from sole U.K. agents.

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**THE HIGHEST POSSIBLE STANDARD
OF HYGIENE IN HAND DRYING—
AND THE MOST ECONOMICAL**

**Handy-Andy
WARM AIR TOWELS**

**DRY HANDS, FACES
AND FOREARMS**
swiftly, hygienically,
thoroughly

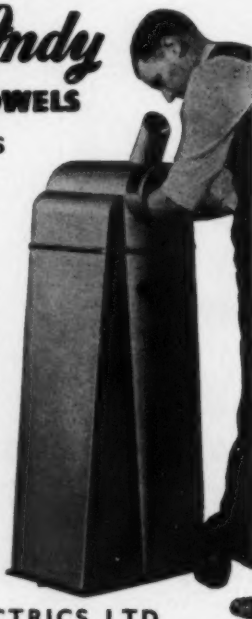
at one quarter the cost of paper towels, at less than one third the cost of laundering. (The saving is even greater if the cost of replacing linen towels is included.) Handy-Andy dries 75 pairs of hands for one unit of electricity and is the most hygienic and economical means of complying with section 42 of the Factory Act. What you save will pay for your Handy Andys in less than a year.

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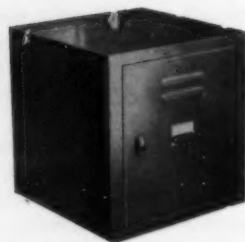
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Rigidly interlocking by patented device these sturdy steel cube lockers offer endless possibilities for space saving.

Stove-enamelled in choice of attractive colours. Firmly closing door, fitted with either chromium plated finger pull and ball catch or English 6 lever lock. Extra parts provide for coat hanging and seating.

A 6in. stand permits use of lockers over steam pipe for airing. Made in two sizes—12in. or 15in.

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the new, All-purpose hydraulic working platform

"Spaceman"

saves time and money from
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With a "Spaceman" on the premises, costly, laborious, cumbersome scaffolding, and the hazardous use of ladders are things of the past. The "Spaceman" provides immediate access for your operators to all overhead jobs, such as painting, installing, wiring, inspecting and general maintenance work, with substantial savings in time and labour. Available in four sizes with respective working heights of 21ft., 26ft., 30ft. and 40ft., the "Spaceman" folds up compactly to negotiate narrow passages, and normal doorways with ease.



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